MITSUBISHI

PART NO. 599910538

SERVICE MANUAL

COLOR DISPLAY MONITOR **Diamond Pro 730**

MODEL Diamond Pro 730 (B)

NEC-MITSUBISHI ELECTRIC VISUAL SYSTEMS CORPORATION

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WARNING

The SERVICE PERSONNEL should have the appropriate technical training, knowledge and experience necessary to:

- Be familiar with specialized test equipment, and
- Be careful to follow all safety procedures associated with high voltage CRT circuit designs to minimize danger to themselves and their coworkers.

To avoid electrical shocks, this equipment should be used with an appropriate power code and be connected only to a properly grounded AC outlet.

This equipment utilized a micro-gap power switch. Turn off the set by first pushing the front panel power switch. Next, remove the power cord from the AC outlet.

To prevent fire or shock hazards, do not expose this unit to rain or moisture.

This symbol warns the personnel that un-insulated voltage within the unit may have sufficient magnitude to cause electric shock.

This symbol alerts the personnel that important literature concerning the operation and maintenance of this unit has been included.

Therefore, it should be read carefully in order to avoid any problems.

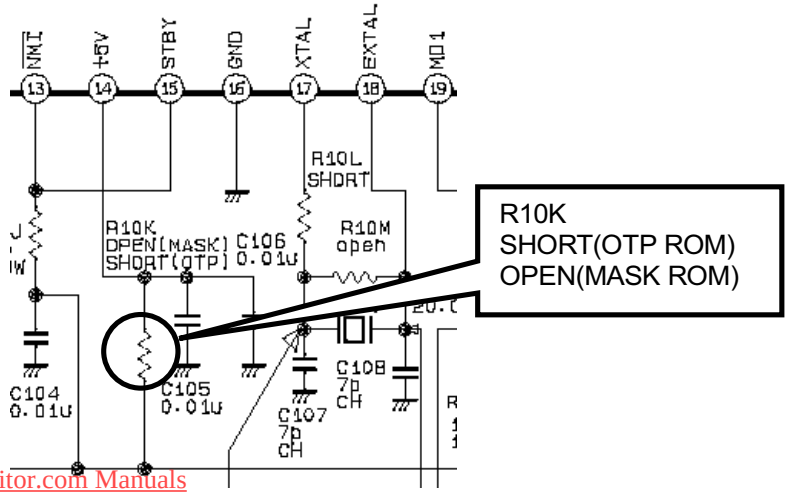
NOTES

Two types of ICs are used for the MPU (IC100) that is mounted on the MAIN PWB ASSY of this model.

In case of MPU replacement, working procedures should conform to the table specified below.

The service part for the MPU (IC100) is the mask ROM (HD 6433577P20 A07) only. Therefore, when replacing the MPU of the OTP ROM, R10K should be deleted (opened).

Type of IC	MPU stamping	Circuit constant of R10K
OTP ROM (one time)	HD6473577P20	short
MASK ROM (mask)	HD6433577P20 A07	open



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PRODUCT SAFETY CAUTION

1. When parts replacement is required for servicing, always use the manufacturer's specified replacement.
2. Comply with all caution and safety-related notes on the product display chassis and picture tube.
3. When replacing the component, always be certain that all the components are put back in the place.
4. When servicing display monitor unit, it is required that the provided lead dress is used in the high voltage circuit area.
5. It is also recommended that shatter proof goggles are worn, when removing installing and handling the picture tube. People not equipped with the proper precautionary measures mentioned should keep the picture tube away from body while handling.
6. As for a connector, pick and extract housing with fingers properly since a disconnection and improper contacts may occur, when wires of the connector are led.
7. Use a proper screwdriver. If you use screwdriver that does not fit, you may damage the screws.
8. X-radiation precaution

   This product contains critical electrical and mechanical parts essential for X-ray protection.

   Normal anode voltage is 27.0 kV at zero beam picture tube current under AC 100-120V/220-240V input, and anode voltage must not exceed the voltages shown below under any operation condition.

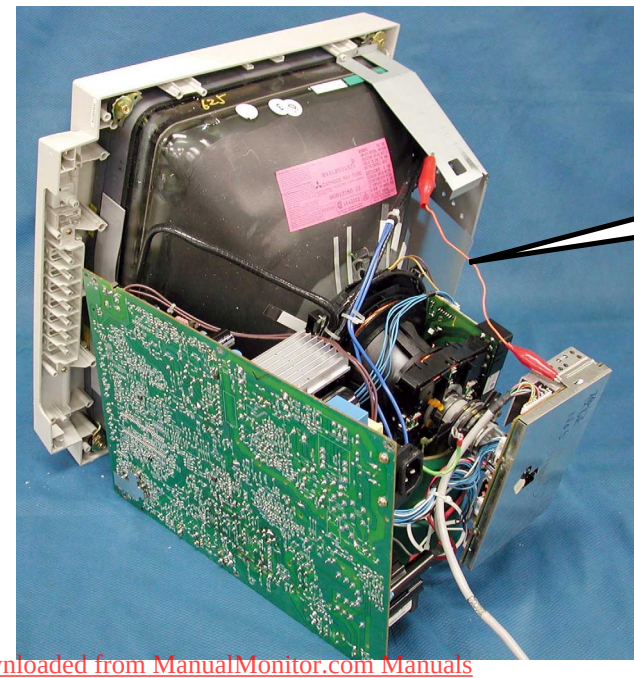
   To measure anode voltage set brightness for very dim picture, and use a high impedance volt meter between chassis and anode lead and measure high voltage.

   If high voltage exceeds the specifications on the chassis schematic diagram, take the necessary corrective action.

Table MAXIMUM ANODE VOLTAGE

beam current	at 0 mA	at 0.7 mA	at 1.4 mA
B	34.5 kV	32.5 kV	32.3 kV

9. When you degauss the set with an external degaussing coil, you must keep strictly item " * Notes about degaussing method " of ADJUSTMENT PROCEDURES.
10. Refer to the photo shown below when turning on the main PWB ASSY. At that time, never fail to connect an earth wire for spark suppression (between CRT and MAIN PWB or CRT PWB).



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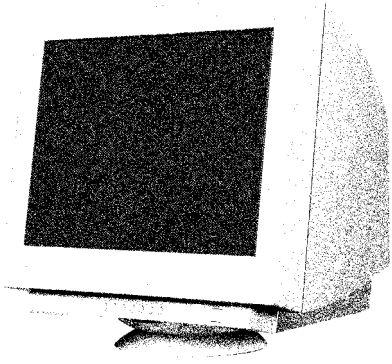
AUTO-SCANNING WITH DIGITAL CONTROL
COLOR DISPLAY MONITOR

Diamond Pro 730

Model **JC-17W41**

USER'S GUIDE



For future reference, record the serial number of your display monitor in the space below:

SERIAL No. [ ]

The serial number is located on the rear cover of the monitor.

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1.2 Internal Preset Memory Capability

To minimize adjustment needs, the factory has preset popular display standards into the monitor, as shown in Table 1. If any of these display standards are detected, the picture size and position are automatically adjusted. All of the factory presets may be overwritten by adjusting the user controls. This monitor is capable of automatically storing up to 16 additional display standards. The new display information must differ from any of the existing display standards by at least 1kHz for the horizontal scan frequency or 5Hz for the vertical scan frequency or the sync signal polarities must be different.

Table 1. Memory Buffer Factory Presets

PRESET TIMING	Fh(kHz)	Fv (Hz)	Polarity H	Polarity V
640 x 480 N.I.	31.5	59.9	–	–
640 x 480 N.I.	37.5	75.0	–	–
800 x 600 N.I.	46.9	75.0	+	+
800 x 600 N.I.	53.7	85.0	+	+
1024 x 768 N.I.	60.0	75.0	+	+
1024 x 768 N.I.	68.7	85.0	+	+
1280 x 1024 N.I.	80.0	75.0	+	+
1280 x 1024 N.I.	91.1	85.0	+	+
1600 x 1200 N.I.	93.8	75.0	+	+

1.3 Power Management Function

The monitor has a power management function which reduces the power consumption of the monitor when not in use.
The power saving mode is invoked by a VESA DPMS-compliant computer. Check your computer's manual for setting this function.

Mode	Power	Power-On Indicator
Normal	89 W	Green
Power Saving Mode	=<5 W	Orange

1.4 DDC

The monitor includes the VESA DDC™ 1 and DDC™ 2B feature. DDC (Display Data Channel) is a communication channel over which the monitor automatically informs the computer system about its capabilities (e.g. each supported resolution with its corresponding timing).
DDC is routed through previously unused pins of the 15-pin VGA connector.
The system will “Plug and Play” if both monitor and computer implement the DDC protocol.

1.5 Location Considerations

When setting up and using the monitor, keep the following in mind:

- For optimum viewing, avoid placing the monitor against a bright background or where sunlight or other light sources may reflect on the display area of the monitor. Place the monitor just below eye level.
- Place the monitor away from strong magnetic or electromagnetic fields, such as high capacity transformers, electric motors, large current power lines, steel pillars, etc....
  Magnetism can cause distortion in the picture and/or color purity.
- Avoid covering the slots or openings of the monitor. Allow adequate ventilation around the monitor so the heat from the monitor can properly dissipate. Avoid putting the monitor into any enclosure that does not have adequate ventilation.
- Avoid exposing the monitor to rain, excessive moisture, or dust, as this can cause a fire or shock hazard.
- Avoid placing the monitor, or any other heavy object, on the power cord. Damage to the power cord can cause a fire or electrical shock.
- When transporting the monitor, handle it with care.

1.6 Cleaning Your Monitor

When cleaning the monitor, please follow these guidelines:

- Always unplug the monitor before cleaning.
- Wipe the screen and cabinet front and sides with a soft cloth.
- If the screen requires more than dusting, apply a household window cleaner to a soft cloth to clean the monitor screen.

CAUTION

- *Do not use benzene, thinner or any volatile substances to clean the unit as the finish may be permanently marked.*
- *Never leave the monitor in contact with rubber or vinyl for an extended time period.*
- *Do not spray directly on the screen as cleaner may drip into the monitor and damage the circuitry.*
- *Never use an abrasive cleaner on the screen surface as this will damage the anti-reflection coating.*

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1.7 Unpacking

After you unpack the box you should have all of the items indicated in Figure 1. Save the box and packing materials in case you transport the monitor.

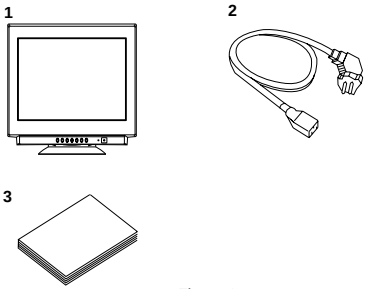


Figure 1

1. Color Monitor
2. AC Power Cord
3. User's Guide (this document)

1.8 Tilt/Swivel Base

The monitor comes with a tilt/swivel base. This enables you to position the monitor at the best angle and tilt for maximum viewing comfort.

Screen Position Adjustment

Adjust the tilt and rotation of the monitor by placing your hands at opposite sides of the case. You can adjust the monitor 90 degrees right or left, 10 degrees up or 5 degrees down, as shown below.

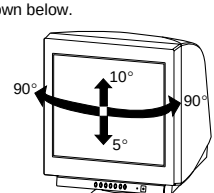


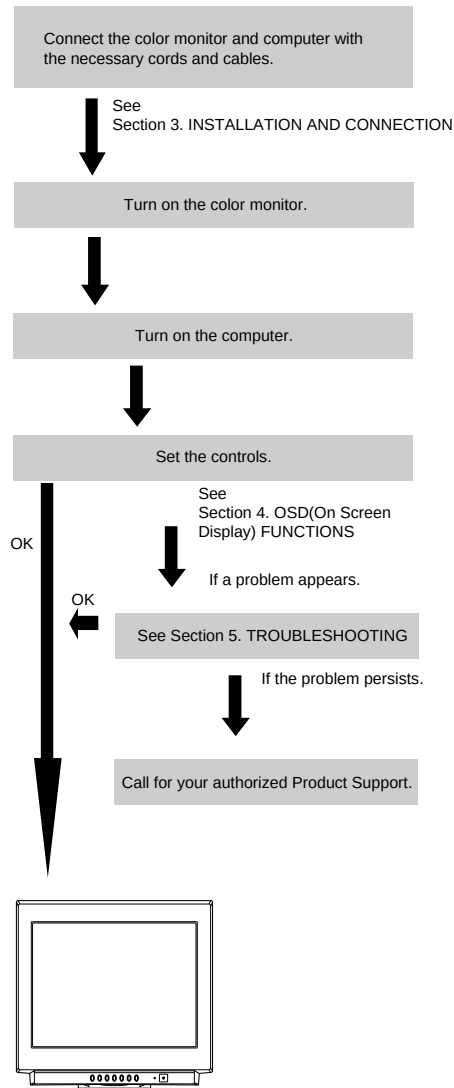
Figure 2

CAUTION

Keep your fingers away from the pivot area of the tilt/swivel base.

1.9 Quick Operation Chart

To summarize the steps in connecting your computer with the color monitor and setting the necessary controls and switches, refer to the chart below.


Connect the color monitor and computer with the necessary cords and cables.
See
Section 3. INSTALLATION AND CONNECTION
Turn on the color monitor.
Turn on the computer.
Set the controls.
See
Section 4. OSD(On Screen Display) FUNCTIONS
OK
If a problem appears.
OK
See Section 5. TROUBLESHOOTING
If the problem persists.
Call for your authorized Product Support.

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2 PART NAME

2.1 Control Names

See Figures 3 and 4 for the location of the user controls, indicator and connectors.
Each part is identified by number and is described individually.

FRONT

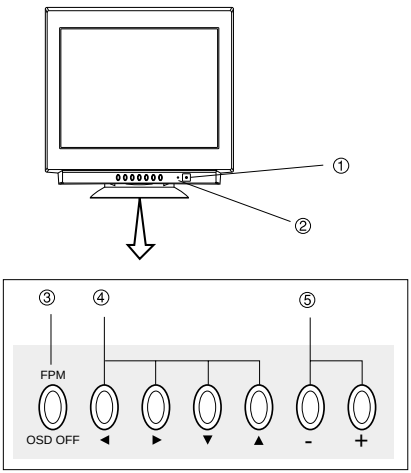

Figure 3

REAR

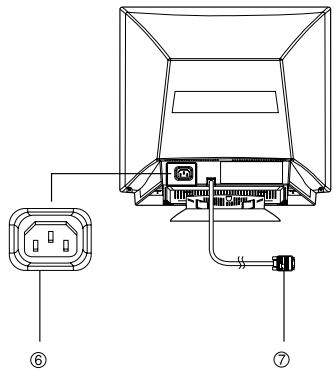

Figure 4

2.2 Function

1. **POWER SWITCH:** A push-on / push-off switch for AC power.
2. **POWER-ON INDICATOR:** This indicator illuminates green when AC power is on, and illuminates orange when the monitor is in the power management modes.
3. **FPM (FINE PICTURE MODE) / OSD OFF BUTTON:**
   •Without OSD screen, push to on/off the contrast enhancement function.
   •With OSD screen, push to turn the OSD screen off.
4. **ITEM SELECT BUTTONS:** Push to select the item icon.
5. **FUNCTION ADJUST BUTTONS:** Push the adjust buttons to adjust the image on the screen.
6. **AC POWER CONNECTOR**
7. **SIGNAL INPUT CONNECTOR: DB9-15P**

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3 INSTALLATION AND CONNECTION

On the back of the monitor two kinds of plug-in connections are provided: AC power connector for the AC input, DB9-15P connector for video signal input.

3.1 AC Power Connection

One end of the AC power cord is connected to the AC power connector on the back of the monitor. The other end is plugged into a properly grounded three-prong AC outlet. The monitor's auto-sensing power supply can automatically detect 100-120V AC or 220-240V AC and 50 or 60Hz.

3.2 Signal Cable Connection

The DB9-15P(VGA) connector is provided for compatible analog RGB outputs from your computer. Apple Macintosh computers can also be interfaced with using the optional Mitsubishi Macintosh adapter AD-A205.

3.2.1 Connecting to Any IBM VGA Compatible System

Figure 5 shows the signal cable connection to the Video Graphics Array (VGA) port in an IBM Personal System/2® series, or any VGA compatible system.

1. Power off, both the monitor and the computer.
2. Connect the one end of the signal cable to the DB9-15P connector on the VGA controller card.
3. Power on the monitor, then the computer.
4. After using the system, power off the monitor, then the computer.

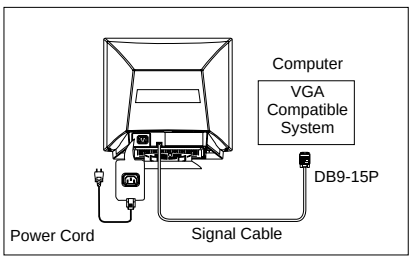

Figure 5

CAUTION

The socket-outlet shall be installed near the equipment and shall be easily accessible. During servicing, disconnect the plug from the socket-outlet.

3.2.2 Connecting to An Apple Macintosh Computer

Figure 6 shows the signal cable and AD-A205 Adapter (option) to the video port in an Apple Macintosh.

The Macintosh Adapter is available that converts the 2 row D-sub video connector on legacy Macintosh computers to a 3 row D-sub(VGA) connector compatible with your Mitsubishi monitor. The Macintosh Adapter is not needed on G3 (ice and blue) and later version of the Macintosh. If the Macintosh Adapter is required for your system, please contact our Information Support.

1. Power off, both the monitor and the computer.
2. Set the DIP switches of Macintosh Adapter according to the setting chart.
   (See Section 7.3 Optional Macintosh Adapter AD-A205 settings.)
3. Connect the 15-pin (DB-15P) end of the AD-A205 Adapter to the straight 15-pin connector on the Macintosh video port on the computer or on the video board.
4. Connect the sub-miniature 15-pin (DB9-15P) end of the AD-A205 Adapter to the signal cable.
5. Power on the monitor, then the Macintosh.
6. After using the system, power off the monitor, then the Macintosh.

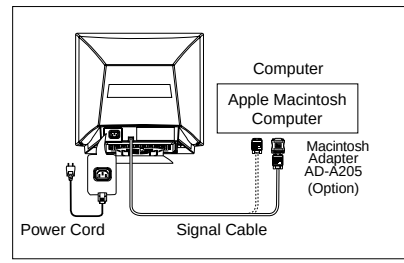

Figure 6

NOTE

- For the Apple Macintosh Computers having a VGA compatible port, steps 2 through 4 are not necessary. Connect the end of the signal cable to the port directly.
- In case of Apple Macintosh G3 series, use "Control Panel" of "Apple Menu" when selecting a resolution. If select the resolution from "Control Bar", no screen may be displayed and the computer may freeze.

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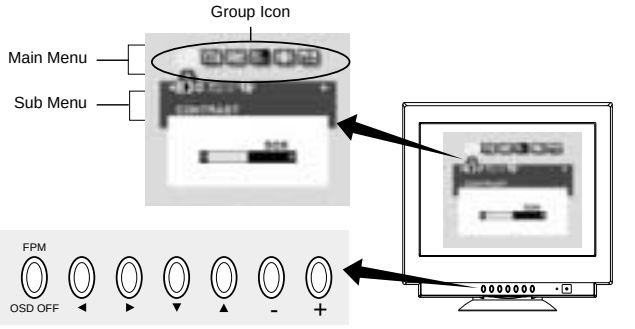
4 OSD (On Screen Display) FUNCTIONS

4.1 How to adjust the screen

The monitor has an OSD(On Screen Display) function.
The following procedure shows how to adjust the screen using the OSD function.



(1) Turn on the monitor by pressing

(2) Display the OSD screen by pressing

(3) Select the group icon on Main Menu by pressing

(4) Display the Sub Menu by pressing

(5) Select the item icon on Sub Menu by pressing

(6) Adjust by pressing

(7) To turn the OSD screen off, press button

If you don't press any button for the time set at "OSD TURN OFF", the OSD will turn off automatically.

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4.2 Adjustment Items

x : Available

Group Icon	Item Icon	Item	Press the Minus Button (-)	Press the Plus Button (+)	A	B	C
(SCREEN)		CONTRAST	To decrease the contrast.	To increase the contrast.	X	X	X
		BRIGHT	To decrease the brightness.	To increase the brightness.	X	X	X
	COLOR	COLOR	To select preferable display color mode. And, to adjust the color balance at the selected color mode. **NOTE** When selecting mode "sRGB", "COLOR TEMPERATURE", "CONTRAST" and "BRIGHT" are unavailable.		X	X	X
	K	COLOR TEMPERATURE	To increase the red color level.	To increase the blue color level.	X	X	X
		FACTORY PRESET	————	To restore to factory preset level.	-	-	-
(GEOMETRY)		HORIZ-SIZE	To narrow the width of the image on the screen.	To expand the width of the image on the screen.	X	X	
		HORIZ-POSITION	To move the image on the screen to the left.	To move the image on the screen to the right.	X	X	
		VERT-SIZE	To narrow the height of the image on the screen.	To expand the height of the image on the screen.	X	X	
		VERT-POSITION	To move the image down.	To move the image up.	X	X	
		ROTATION	To rotate the image counterclockwise.	To rotate the image clockwise.	X	X	X
	GTF AUTO	GTF AUTO ADJUST	To adjust the screen size automatically. **NOTE** "GTF AUTO ADJUST" is available when using with the computer which VESA GTF™ function is installed.		-	-	-
		FACTORY PRESET	————	To restore to factory preset level. **NOTE** If a non-Factory Preset timing is used, "FACTORY PRESET" is unavailable.	-	-	-
(DISTORTION)		PINCUSHION	To collapse the center of the image.	To expand the center of the image.	X	X	
		PIN-BALANCE	To move the top and bottom of the screen image to the right.	To move the top and bottom of the screen image to the left.	X	X	
		KEYSTONE	To decrease the width at the top of the screen image and to increase the width at the bottom.	To increase the width at the top of the screen image and to decrease the width at the bottom.	X	X	
		KEY-BALANCE	To make the screen slant to the left.	To make the screen slant to the right.	X	X	
		TOP-PIN	To narrow the width of the screen image near the corners of top.	To expand the width of the screen image near the corners of top.	X	X	
		BOTTOM-PIN	To narrow the width of the screen image near the corners of bottom.	To expand the width of the screen image near the corners of bottom.	X	X	
		FACTORY PRESET	————	To restore to factory preset level. **NOTE** If a non-Factory Preset timing is used, "FACTORY PRESET" is unavailable.	-	-	-

A. Press "FACTORY PRESET" to restore to the factory preset level.

B. Press (-) and (+) buttons together, to restore to the factory preset level.

C. Set data does not change by the change of the signal timing.

NOTE

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If a non-Factory Preset timing is used, "FACTORY PRESET" does not work.

x : Available

Group Icon	Item Icon	Item	Press the Minus Button (- / +)	Press the Plus Button (- / +)	A	B	C
(PURITY)		MOIRE CANCEL LEVEL	To decrease the level of the moire-clear wave.		X	X	
	CLAMP	CLAMP PULSE POSITION	To eliminate an excessive green or white-back ground that may occur when external sync signals are applied to the monitor. To clamp the video signal at the front of the H-Sync pulse.	To clamp the video signal at the back of the H-Sync pulse. If you connect to an older Macintosh, you may need to press plus button.	X		
		FACTORY PRESET	————	To restore to factory preset level.	-	-	-
(CONVER.)		HORIZ-CONVERGENCE	To adjust the horizontal beam alignment on the full screen area.		X	X	X
		VERT-CONVERGENCE	To adjust the vertical beam alignment on the full screen area.		X	X	X
		FACTORY PRESET	————	To restore to factory preset level.	-	-	-
(MISC.)		DEGAUSS	————	To eliminate possible color shading or impurity due to magnetic effects.	-	-	-
		POWER SAVE	To select the constant power consumption mode.	To select the power-save mode. (Your computer must be set for power management.)	X	X	X
		CONTROL LOCK	To permit all OSD adjustments.	To lock the OSD function except for "BRIGHT" and "CONTRAST".			X
		NOTE "BRIGHT" and "CONTRAST" are unavailable at the locked condition.					
		OSD POSITION	To move the OSD screen position in a counter clockwise direction.	To move the OSD screen position in a clockwise direction.	X	X	X
	OFF	OSD TURN OFF	To adjust the time that the OSD screen disappear when no access.		X	X	X
	INFO	DIAGNOSIS	Indicates the current scanning frequency, factory or user preset timing number, and signal input connector.		-	-	-
		LANGUAGE	To choose the language used on OSD. ENG.....English, FRA.....French, ESP.....Spanish, GER.....German, JPN.....Japanese				X
	AUTO SAVE	AUTO SAVE	To save the new setting with a confirmation message.	To save the new setting automatically.			X
		NOTE When selecting "OFF", if "SAVE" is not done before the OSD screen disappeared, the new setting is invalid.					
	ALL RESET	ALL RESET	Restores all items to the factory preset level.		-	-	-
		FACTORY PRESET	————	To restore to factory preset level.	-	-	-

A. Press "FACTORY PRESET" to restore to the factory preset level.

B. Press ♀ and ♀ buttons together, to restore to the factory preset level.

C. Set data does not change by the change of the signal timing.

NOTE

If a non-Factory Preset timing is used, "FACTORY PRESET" does not work.

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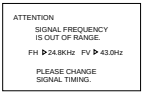
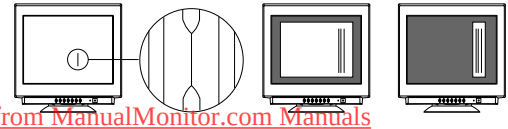
5 TROUBLESHOOTING

Before calling your Authorized Product Support, please check that the items below are properly connected or set. In case of using a non-standard signal, please check the pin assignments and the signal timing of your computer with the specification outlined in Section 6. SPECIFICATIONS.

PROBLEM		ITEMS TO CHECK	LOCATION
No picture	LED On (Green)	• Contrast and brightness controls.	• Front (OSD)
	LED Off	• Power switch. • AC power cord disconnected.	• Front • Rear
	LED On (Orange)	• Signal cable disconnected. • Computer power switch. • Power management function is active.	• Rear • Computer • Press any key on the keyboard or move the mouse.
	LED Blinking (Orange)	• Power switch.	• Front
		NOTE Due to fine dusts existing in the inside of CRT, a discharge may occur at the CRT. When the discharge occur, the monitor may turn off automatically. This is by an internal protection circuit operated and it is to avoid electrical components broken.	
The following message appeared.		• Signal cable disconnected. • Computer power switch. • Power management function is active.	• Rear • Computer • Press any key on the keyboard or move the mouse.
The following message appeared. 		• Input signal frequency range is too high or too low for the monitor to synchronize with.	• Check the specification of graphics adapter.
Abnormal picture	Display is missing, center shifts, or too small or too large of a display size.	• Do "FACTORY PRESET" for a standard signal. • Adjust HORIZ-SIZE, VERT-SIZE, HORIZ-POSITION, and VERT-POSITION with non-standard signals. • Monitor may not be able to get full-screen image depend on signal. In this case, please select other resolution, or other vertical refresh timing. • Make sure you wait a few seconds after adjusting the size of the image before changing or disconnecting the signal.	• Front (OSD) • Front (OSD)
	Black vertical lines are visible on the screen.	• Thin vertical black lines on one or both sides of the screen. This minor condition is caused by grille element overlap which can occur during shipping. • Position an open white window over the affected area of the screen and maximize the brightness and contrast controls. This will cause localized heating of the overlap which will clear in a few minutes. Be sure to readjust the brightness and contrast controls back to the normal viewing levels after this procedure.	



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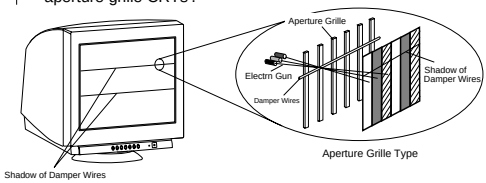
PROBLEM	ITEMS TO CHECK	LOCATION
Two fine horizontal lines are visible on the screen.	• The 2 very faint thin lines across the screen are normal. They are caused by the aperture grille stabilization filaments(Damper Wires) which are required for all aperture grille CRTs'.	
A buzzing sound when power on.	• A brief vibration or hum sound that is heard just after power up is normal. This is caused by the automatic degaussing function. This sound will be heard each time the monitor is powered up from a cold start and each time the manual degauss button is used.	



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6 SPECIFICATIONS

CRT	Size	45cm/17"(41cm/16" Diagonal Viewable Image)
	Mask type	Aperture grille
	Gun	In-line
	Deflection angle	90°
	Phosphors	Red, Green, Blue EBU (medium short persistence)
	Aperture grille pitch	0.25mm
	Face Plate	Anti-glare, Anti-reflection and Anti-static film
	Focusing method	Dynamic Beam Forming (DBF)
INPUT SIGNAL	Video	0.7V analog RGB
	Sync	Separate H, V sync., or Composite sync
SIGNAL INTERFACE	Input Connectors	DB9-15P
	Input Impedance	75 Ω (video), 2.2k Ω(sync.)
SCANNING FREQUENCY	Horizontal	31 - 96kHz
	Vertical	55 - 160Hz
RESOLUTION (HxV)	1600 dots x 1200 lines Non-Interlaced maximum addressable resolution format at 75Hz	
WARM-UP TIME	30 minutes to reach optimum performance level	
BRIGHTNESS	100cd/m^2, standard full white video signal at 9300K (+ 8MPCD)	
BLANKING TIME	Horizontal	≥ 2.9 μsec (typ.)
	Vertical	≥ 500 μsec (typ.)
DISPLAY SIZE	315mm x 236mm(typ.)	ratio 4:3
COLOR	5000K~9300K	
POWER SOURCE	AC100-120/220-240V±10% 50/60Hz 89W (typ.)	
OPERATING ENVIRONMENT	Temperature	10 - 35°C
	Humidity	30 - 80%RH (without condensation)
DIMENSIONS	(W) 399mm x (H) 413mm x (D) 415mm / (W)15.7inch x (H)16.3inch x (D)16.4inch	
WEIGHT	Approx. 19.0kg (41.9lbs.)	
TILT/SWIVEL BASE	Tilt Angle	-5° - +10°
	Swivel Angle	±90°
REGULATIONS	Safety	UL1950 (UL), CSA C22.2 No.950-95 (C-UL) EN60950 (TÜV-GS)
	EMC	FCC Class-B, DOC Class-B EN55022 Class-B EN61000-3-2, EN61000-3-3, EN55024
	X-Ray	DHHS, HWC, Röv vom 8.1, 1987
	Other	CE-Marking, pr EN50279(MPR-III) ISO9241-3, ISO9241-7, ISO9241-8 (TÜV-GS) TCO '99 International ENERGY STAR Program

* This monitor is registered / certified with Model No. JC-17W41.

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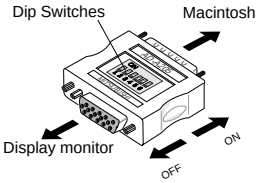
7 APPENDIX

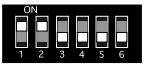
7.1 Optional Macintosh Adapter AD-A205 settings

The AD-A205 Macintosh Adapter(option) allows you to take an advantage of the built in video capabilities of your Macintosh computer with the monitor.

(1) Set the dip switches of the adapter, before connect to the computer.



(2) Set the dip switches according to the following chart. By using the following chart, you can choose a main resolution, quickly.
If you wish to operate by other resolution, refer to next page; “AD-A205 Mac Adapter Setting Chart”

Apple Macintosh	Switch ON	Switch Setting
Macintosh LC, LC II	1,2	
Macintosh LC III, LC475, LC630	2,4	
Macintosh Quadra 610, 650, 700, 800, 840AV, 900, 950 Macintosh Centris 610, 650, 660AV	1,2,3,4	
Performa 6260, 6310, 6410, 6420 Power Macintosh 6100, 6100AV, 6200, 6300 Power Macintosh 7100AV, 7200, 7300, 7500, 7600 Power Macintosh 8100, 8100AV, 8500, 8600 Power Macintosh 9500, 9600 Workgroup Server 7350, 8150, 9150, 9650	1,2,6	
Power Macintosh 4400, G3	3,4	

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<Optional Macintosh Adapter AD-A205 Setting Chart>

● Set the dip switch "ON" as shown below. (Example; "1,2")

RESOLUTION	Macintosh								Performa		Power Macintosh									
	IIsi IIci	IIvi IIvx	LC LCII	LCIII LC475	LC630	Quadra 700 900	Quadra 610 650 800 950 Centris 610 650	Quadra 840AV Centris 660AV	6260 6310	6410 6420	Workgroup Server 8150 9150 6100 8100 6100AV 7100AV 8100AV DRAM Video Port (HDI-45)	8100 VRAM Video Card (DB-15) 6100AV 7100AV 8100AV AV Video Card (DB-15)	6200 6300	7200	4400	7300 7500 7600 8500 8600 Workgroup Server 7350	9500	9600/233 Workgroup Server 9650	9600/300 9600/350	G3
640 x480@60Hz		3,4	3,4	3,4	3,4	3,4	3,4	3,4	1,2,6	1,2,6	3,4	3,4	1,2,6	3,4	3,4	3,4	3,4	3,4	3,4	3,4
640 x480@67Hz		×	×	1,2	1,2	1,2	1,2	1,2	1,2,6	1,2,6	1,2,6	1,2,6	1,2,6	1,2,6	3,4	1,2,6	1,2,6	1,2,6	1,2,6	3,4
640 x480@72Hz															3,4					3,4
640 x480@75Hz															3,4					3,4
640 x480@85Hz																				3,4
800 x600@60Hz					3,4				1,2,6	1,2,6			1,2,6	3,4	3,4	3,4	3,4	3,4	3,4	3,4
800 x600@72Hz					3,4			3,4	1,2,6	1,2,6		3,4	1,2,6	3,4	3,4	3,4	3,4	3,4	3,4	3,4
800 x600@75Hz														3,4	3,4	3,4	3,4	3,4	3,4	3,4
800 x600@85Hz																			3,4	3,4
832 x624@75Hz				2,4	2,4	2,4	2,4	2,4	1,2,6	1,2,6	1,2,6	1,2,6	1,2,6	1,2,6	3,4	1,2,6	1,2,6	1,2,6	1,2,6	3,4
1024 x768@60Hz								3,4		1,2,6		3,4		3,4	3,4	3,4	3,4	3,4	3,4	3,4
1024 x768@70Hz								3,4				3,4			3,4		3,4		3,4	3,4
1024 x768@72Hz										1,2,6				3,4		3,4		3,4		
1024 x768@75Hz							2,3	2,3				1,2,6		1,2,6	3,4	1,2,6	1,2,6	1,2,6	1,2,6	3,4
1024 x768@85Hz																			3,4	3,4
1152 x870@75Hz						1,2,3,4	1,2,3,4	1,2,3,4				1,2,6		1,2,6	3,4	1,2,6	1,2,6	1,2,6	1,2,6	3,4
1280 x960@60Hz																			3,4	
1280 x960@75Hz															3,4	1,2,6	3,4	1,2,6	1,2,6	3,4
1280 x960@85Hz																			3,4	
1280 x1024@60Hz															3,4		3,4		3,4	3,4
1280 x1024@75Hz															3,4	1,2,6	1,2,6	1,2,6	1,2,6	3,4
1280 x1024@85Hz																			3,4	3,4
1600 x1200@60Hz																		1,2,6	1,2,6	3,4
1600 x1200@65Hz																			1,2,6	3,4
1600 x1200@67Hz																		1,2,6		
1600 x1200@70Hz																				3,4
1600 x1200@75Hz																		1,2,6	1,2,6	3,4

1. The resolution does not change with the computer powered on when you set the dip switches.
   Be sure to power off the computer when you set the dip switches.
2. Set the dip switches by a pointed article like a pencil or ball point pen to touch end of the switch groove.

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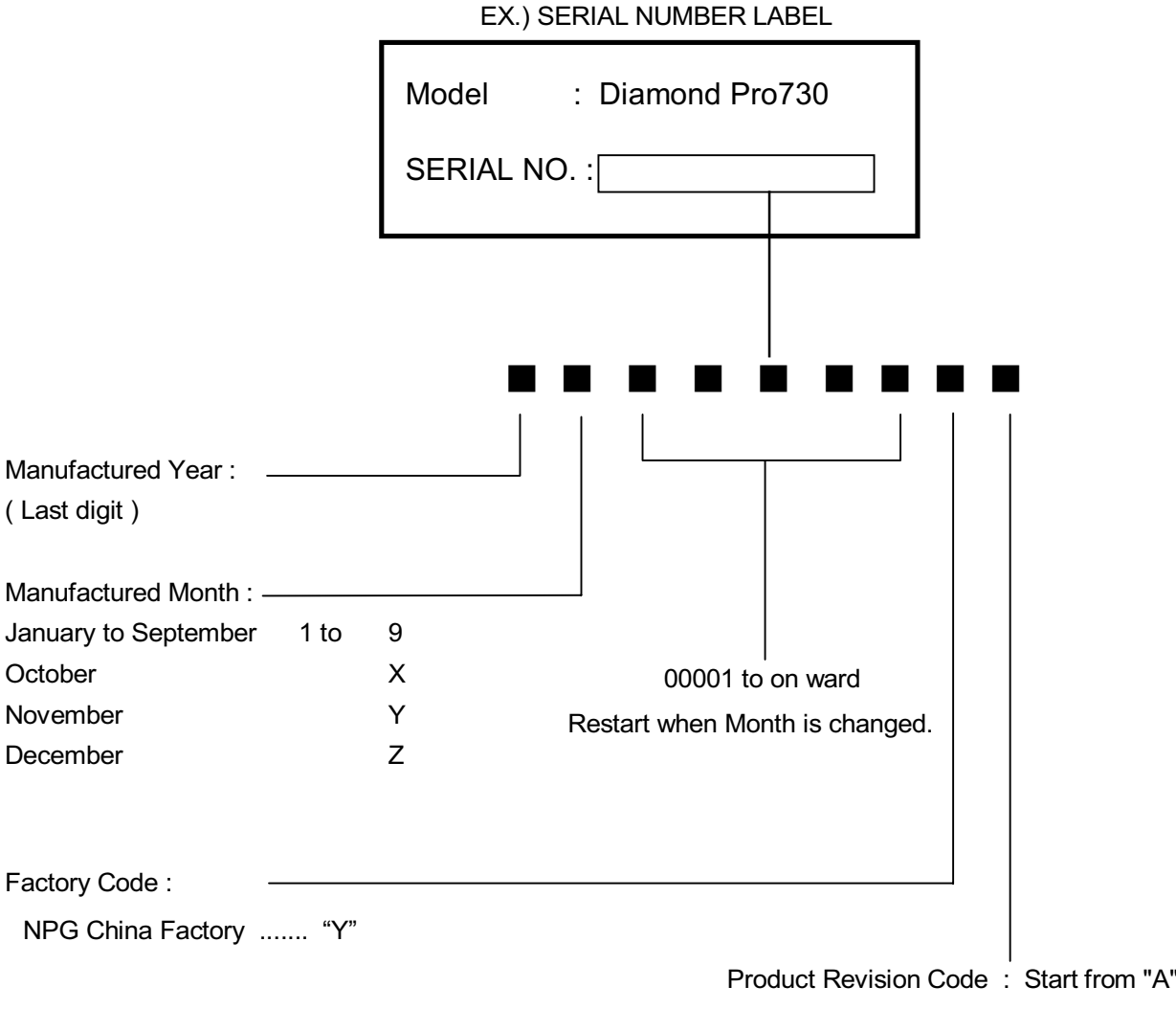
(3) "AD-A205 Mac Adapter Setting Chart" shows all available modes for Macintosh systems and all possible combinations with the monitor.
We recommend that you use the monitor with a preset timing. (See Section 1.2 Internal Preset Memory Capability)

(4) Please refer to the instruction book of your computer about the resolution setting.
Resolution may not be changed on some computers.

Serial Number Information

Refer to the serial number information shown below.



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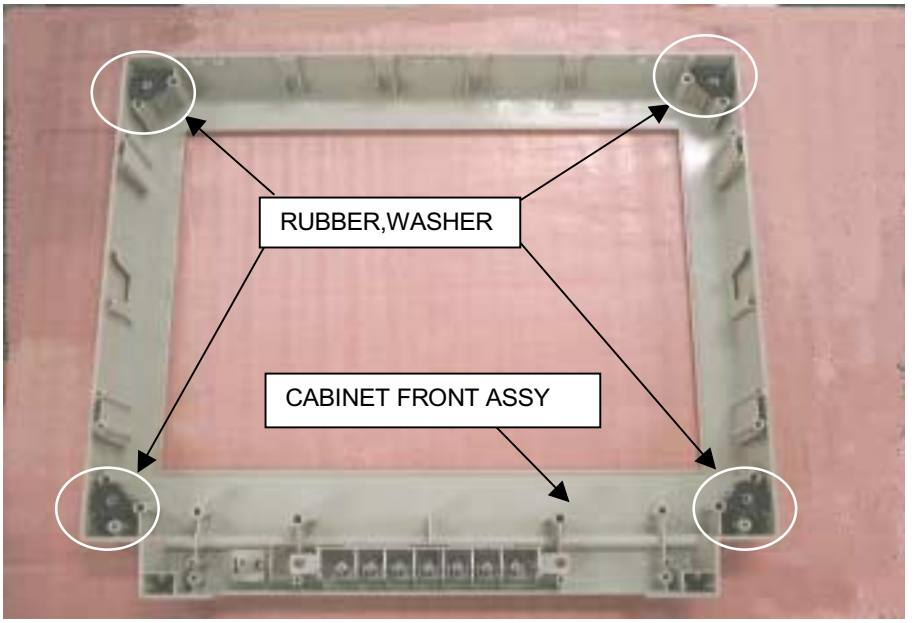
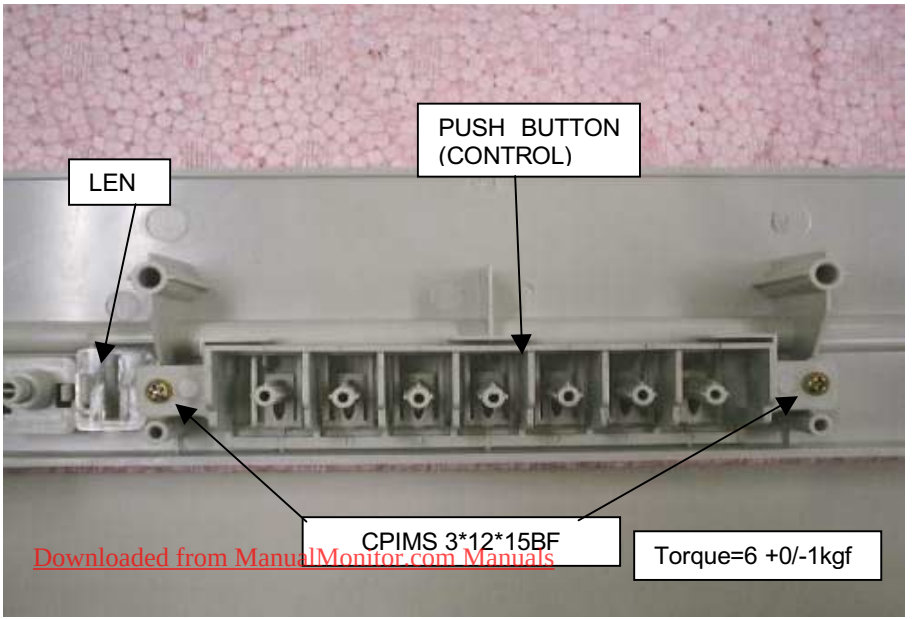
ASSEMBLY

- Before you disassemble the set, turn off power and pull out the power plug.
- Use the appropriate screwdrivers that first the screws. If you use screwdriver that does not fit, you may break the screws.
- Disassembly is the opposite process of assembly.
- Carefully discharge the CRT anode potential by grounding to coating dag before removing Anode Cap.

1. Put the RUBBER,WASHER(4PCS) on the Cabinet Front'S CRT BOSS.



2. Mount and Screw the PUSH BUTTON(CONTROL) and the LENS on the CABINET FRONT ASSY.



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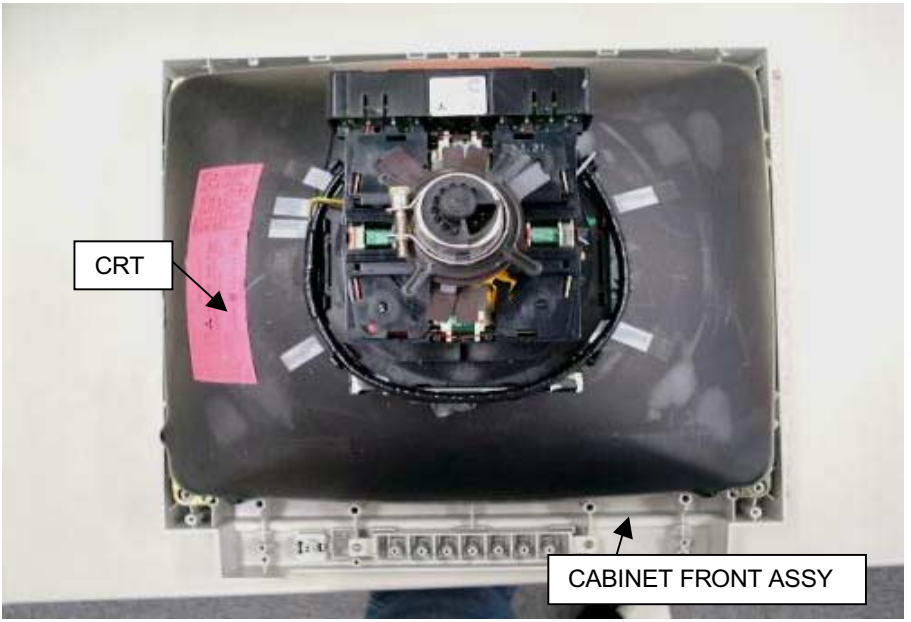
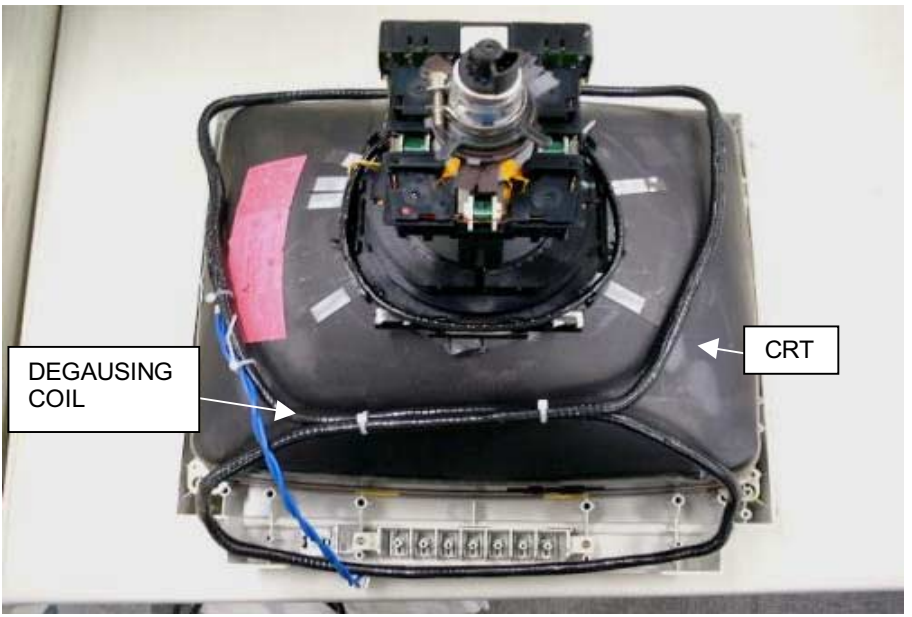
3. Mount CRT to the CABINET FRONT ASSY.



4. Mount the DEGAUSING COIL to the CRT.



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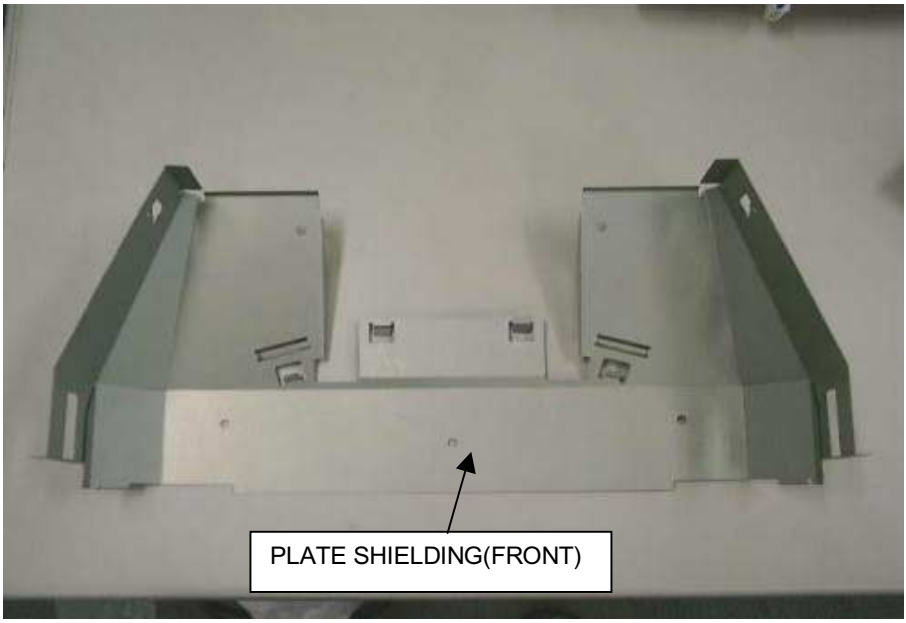
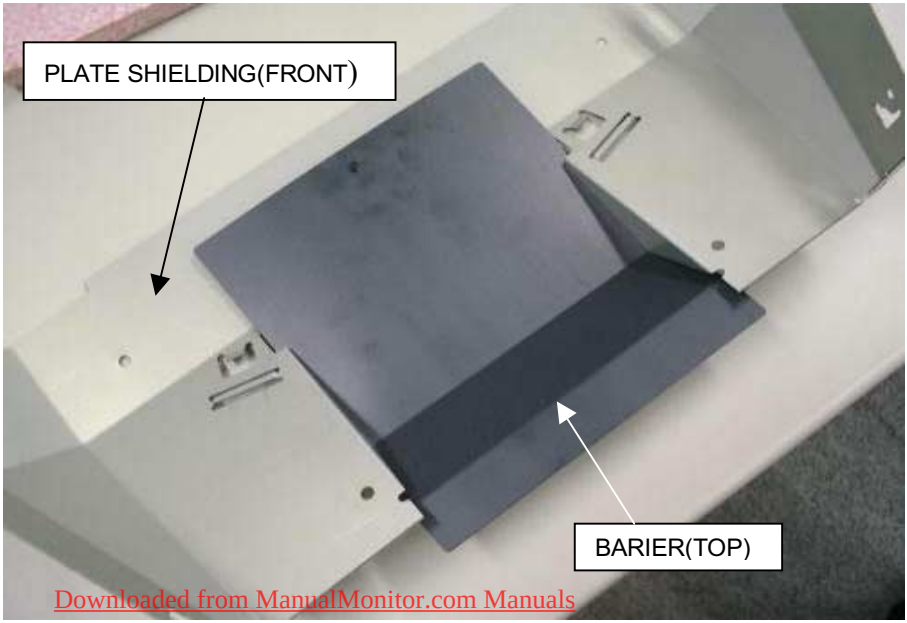
5. Put the PLATE SHIELDING(FRONT) on the desk.



6. Mount and slide the BARIER(TOP) to the PLATE SHIELDING(FRONT).



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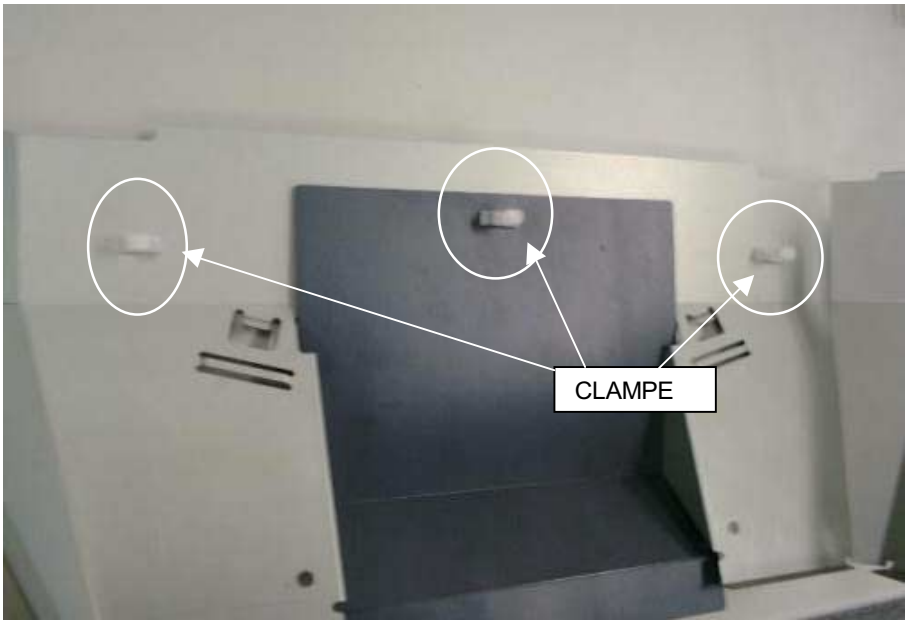
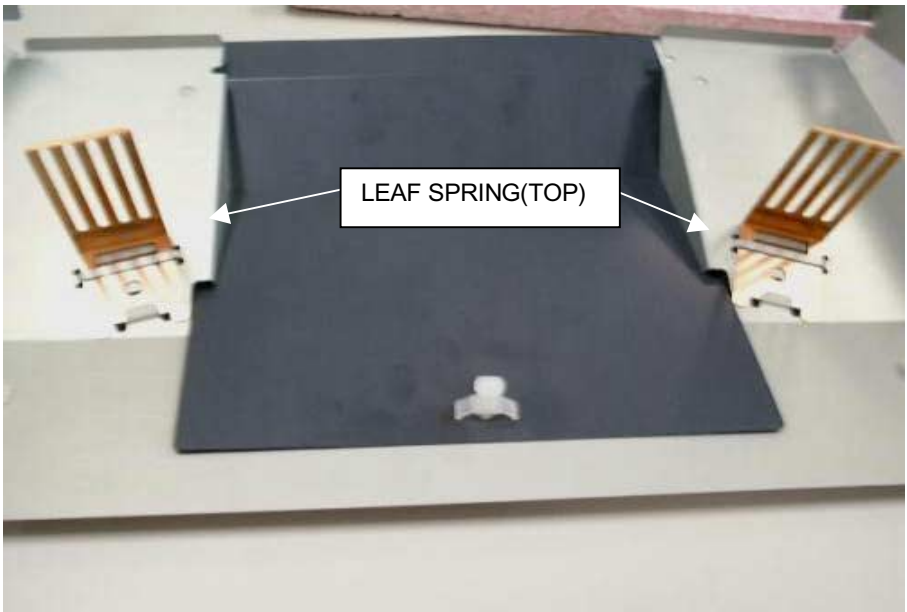
7. Put in the CLAMPER to the PLATE SHIELDING(FRONT).(3point)



8. Put and slide the LEAF SPRING(TOP) to the PLATE SHIELDING(FRONT).(2point)



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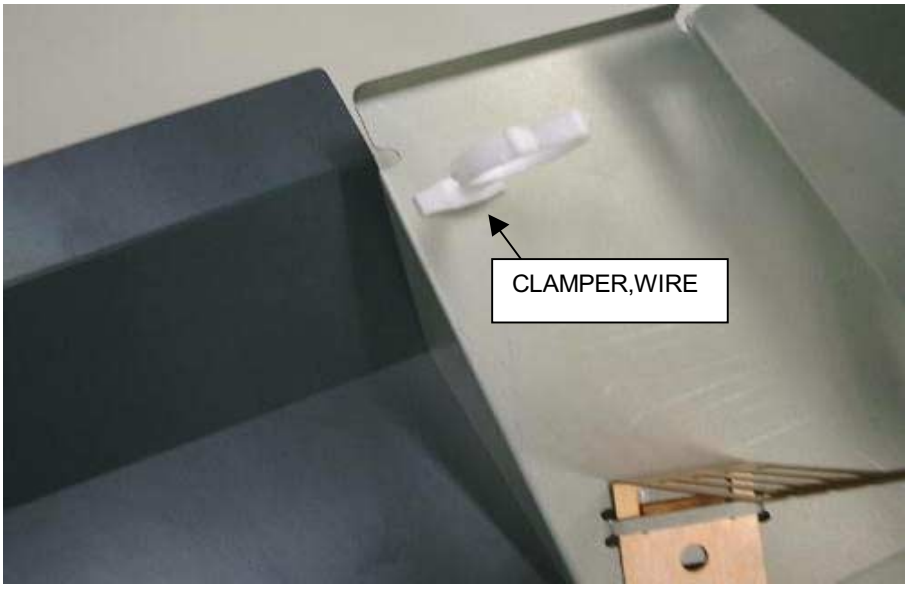
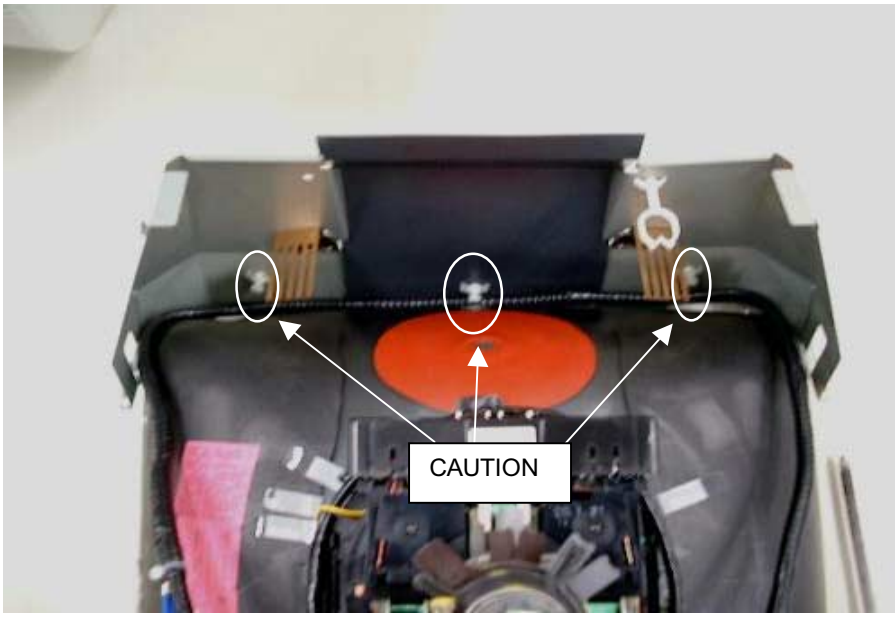
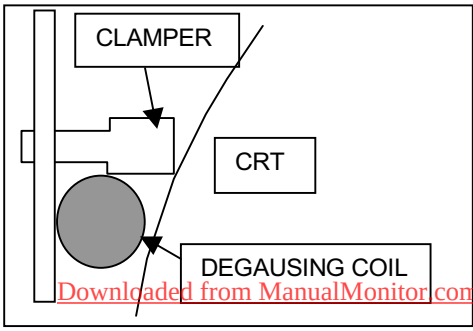
9. Put in the CLAMPER,WIRE to the PLATE SHIELDING(FRONT).(1point)



10. Mount the PLATE SHIELDING(FRONT) to the CRT.



Caution: Put the PLATE SHIELDING(FRONT)'s CLAMPER on the DEGAUSING COIL.



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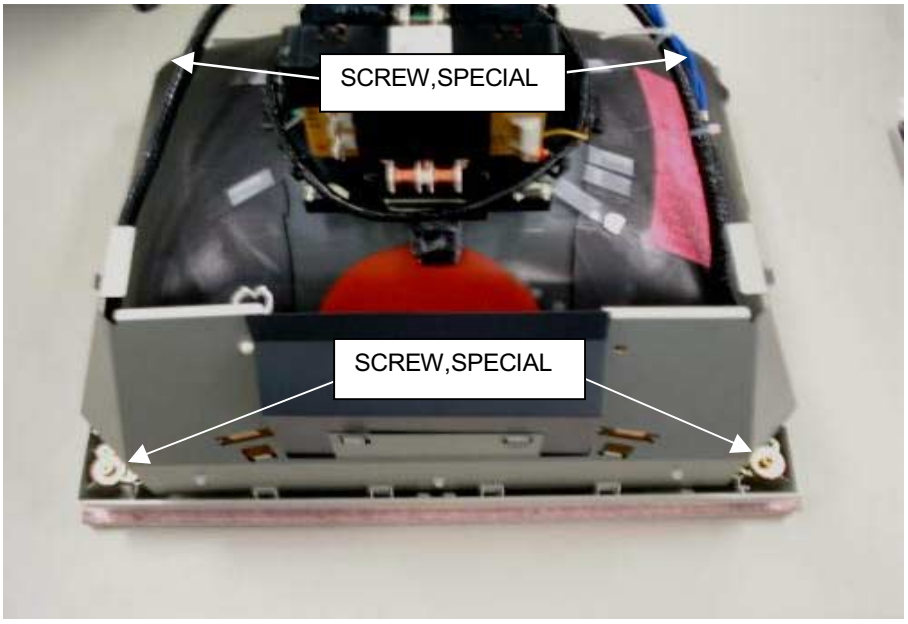
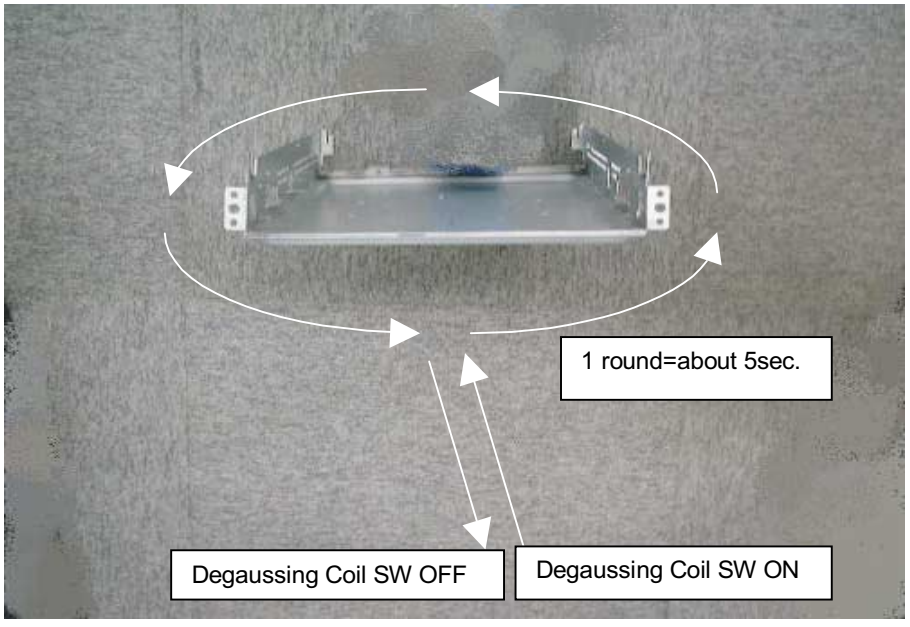
11. Screw the CABINET FRONT ASSY to the PLATE SHIELDING(FRONT).(2point) And screw the CABINET FRONT ASSY to the CRT.(2point)



12. Before use CHASSIS BASE, Degauss both outside and inside surface of the CHASSIS BASE.



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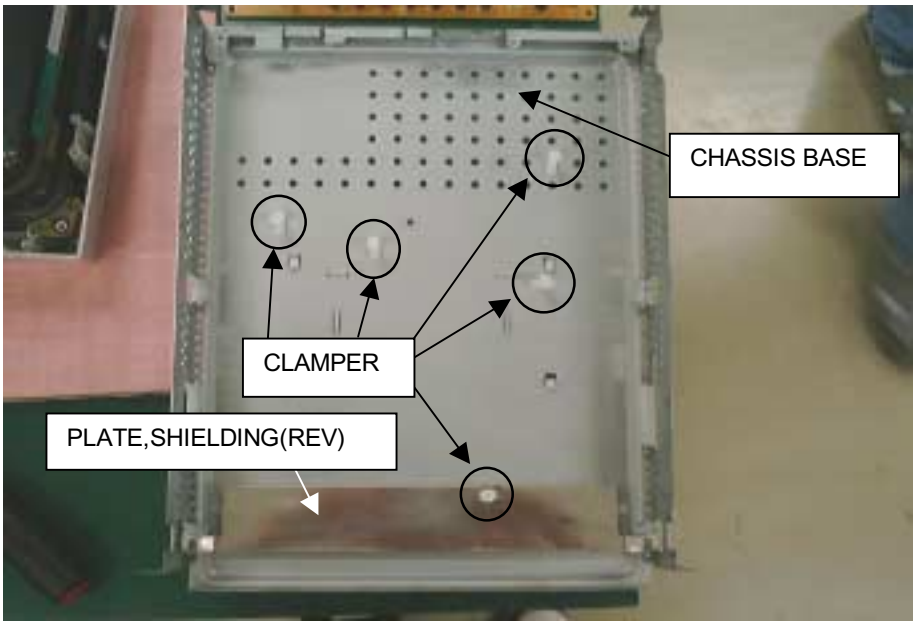
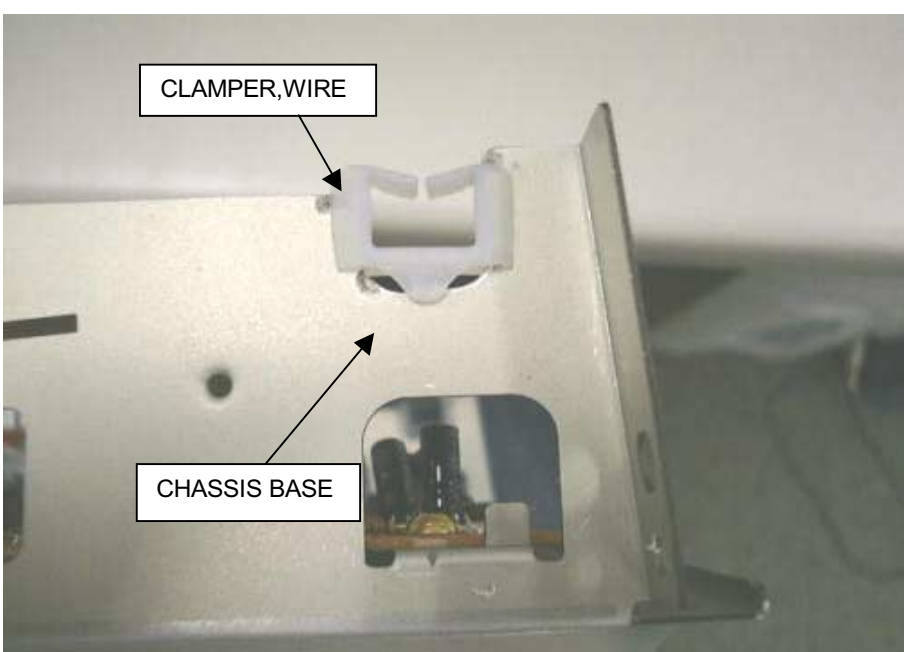
13. Put the CLAMPER(5PCS) and PLATE,SHIELDING(REV) on the CHASIS BASE.



14. Put in CLAMPER,WIRE on the CHASSIS BASE.(L,R 2pcs)



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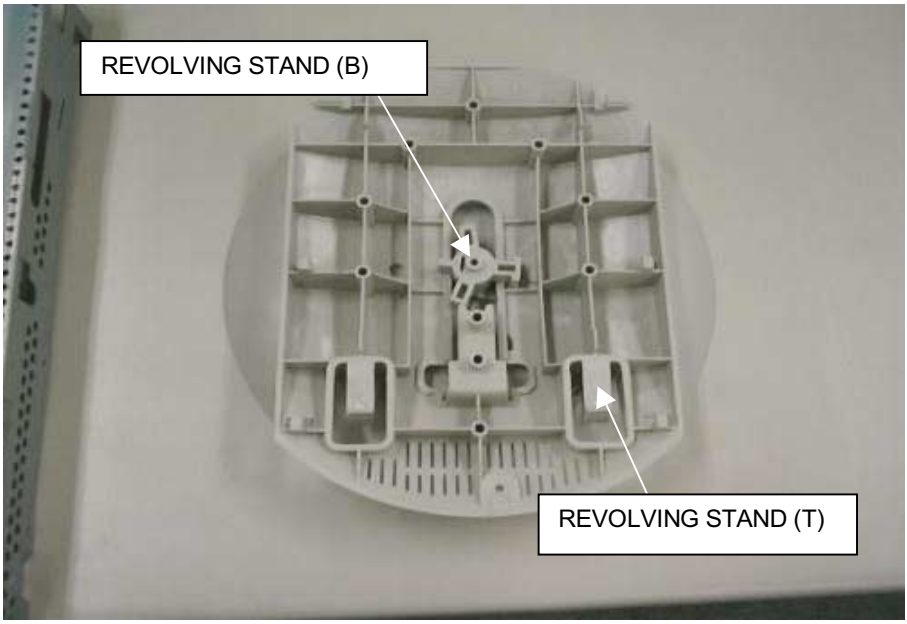
15. Put and Mount the REVOLVING STAND(T) on the REVOLVING STAND(B).



16. Mount the REVOLVING STAND ASSY to the CHASSIS BASE.

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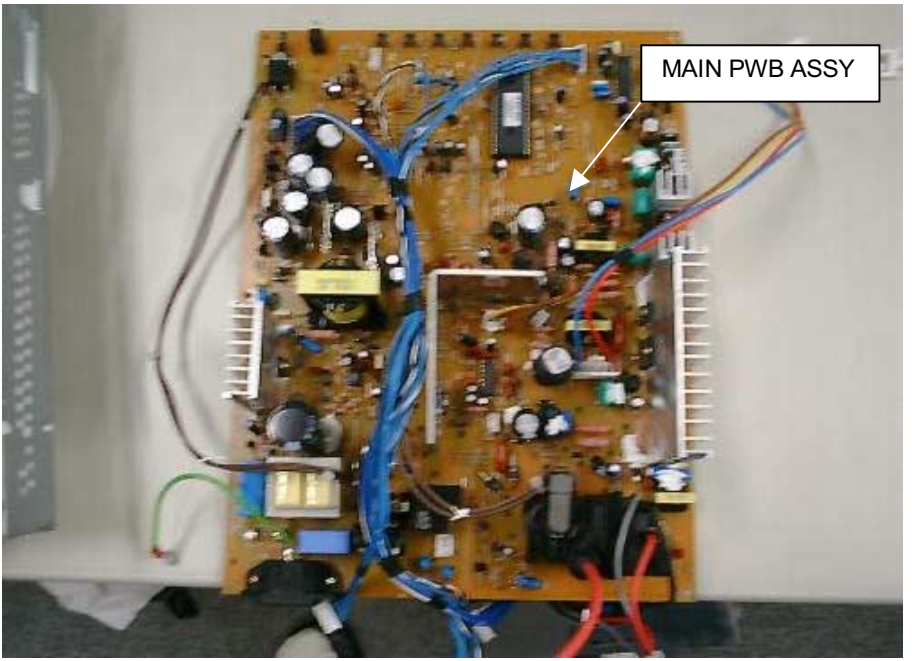
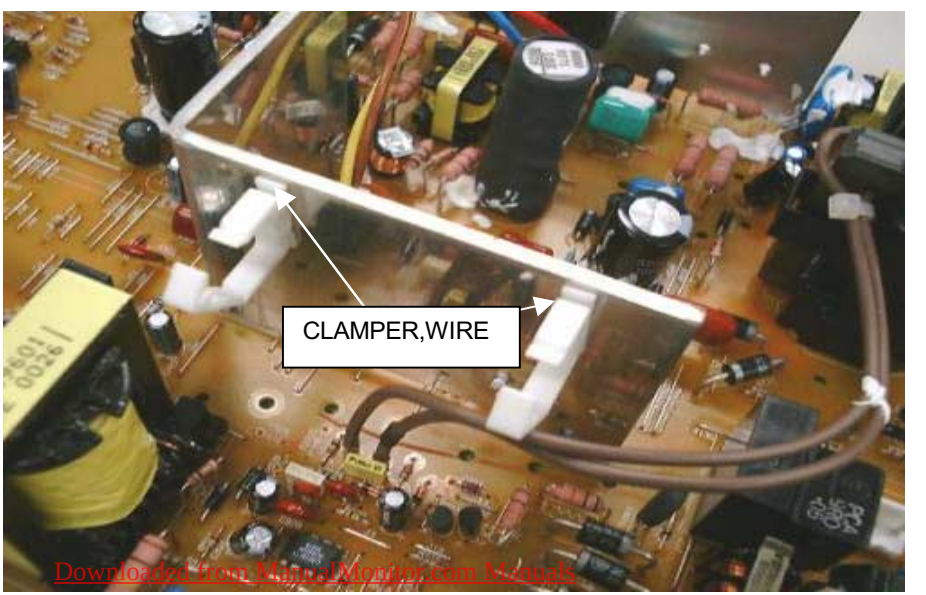
17. Put the MAIN PWB ASSY on the desk.



18. Put in the CLAMPER,WIRE to the HEATSINK.(2point)



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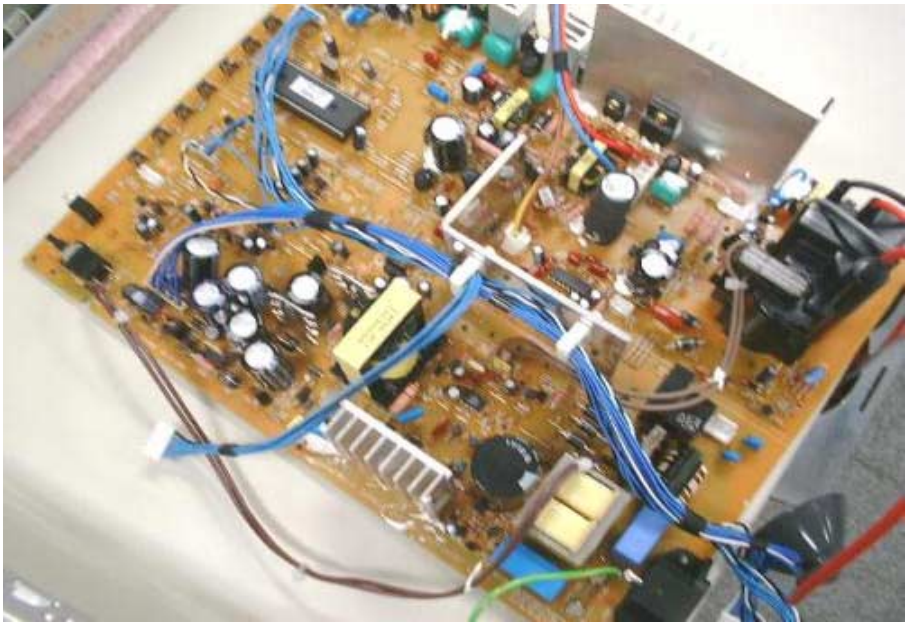
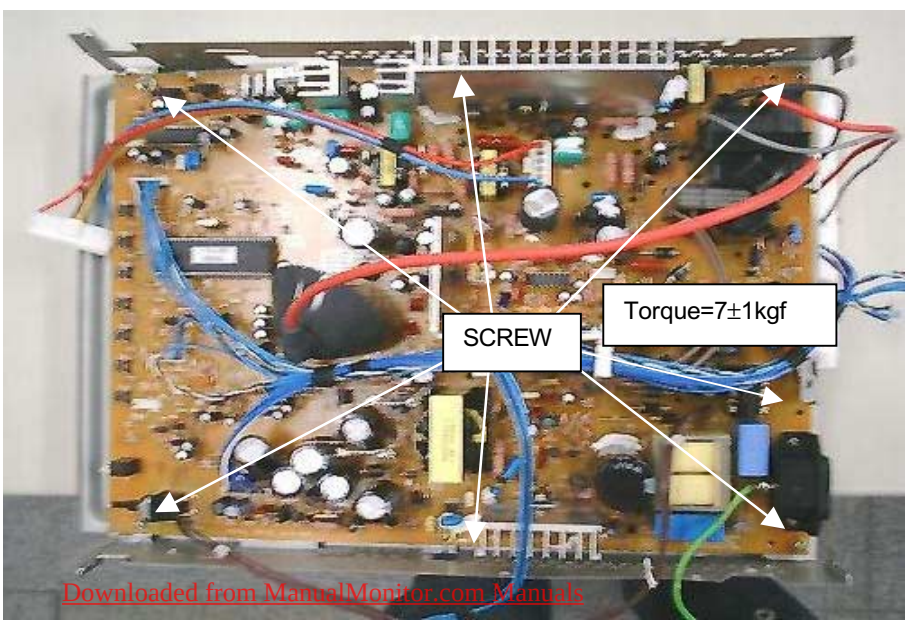
19. Put in CN101, CN105, CN902 on the CLAMPER,WIRE.



20. Mount and Screw(7point) the MAIN PWB ASSY on the CHASSIS BASE.



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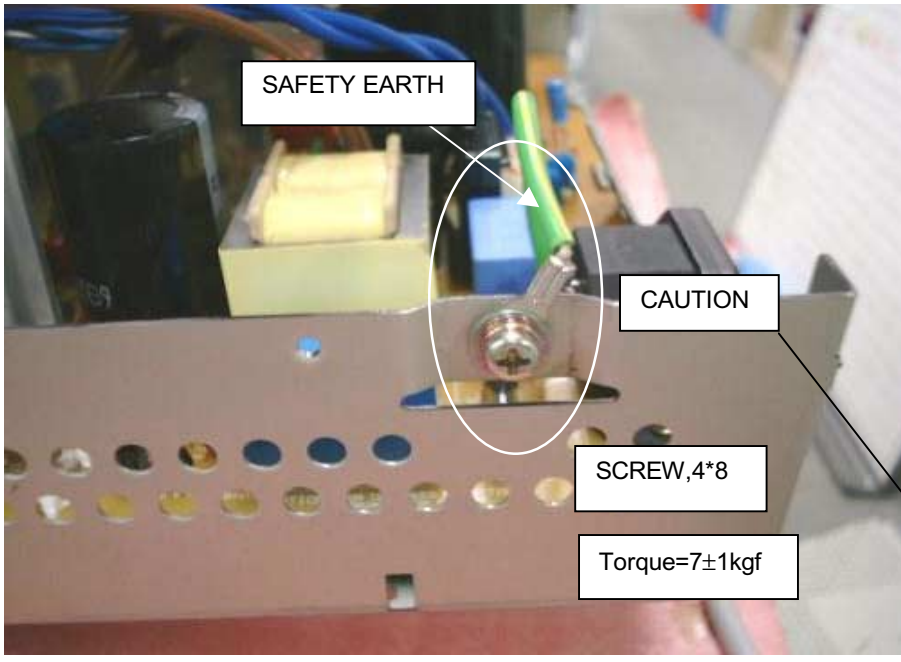
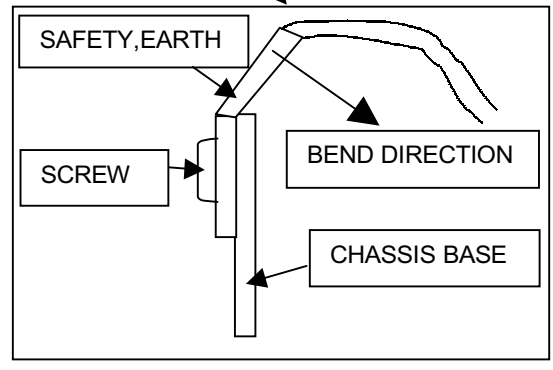
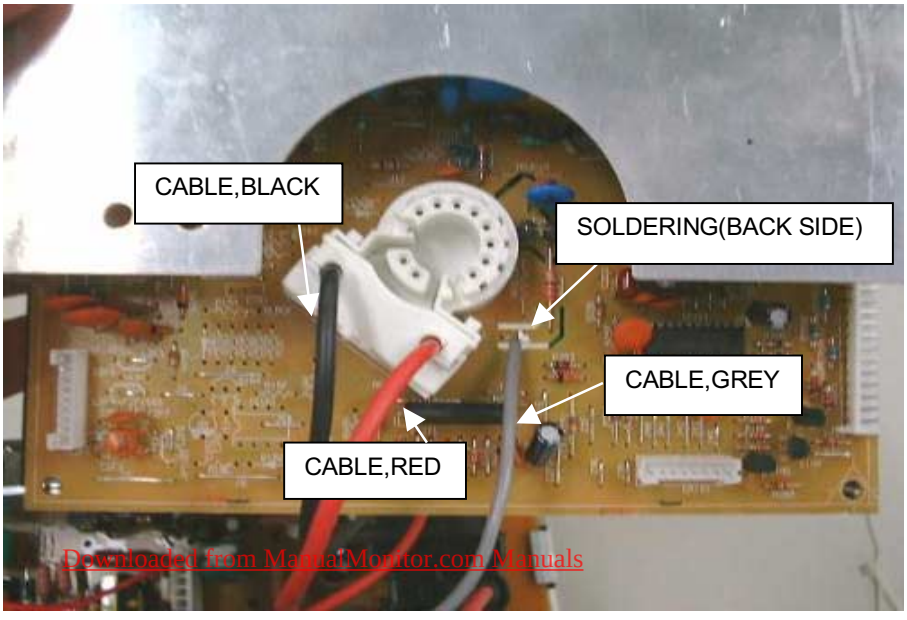
21. Screw the safety earth terminal to the CHASSIS BASE.





22. Put in the CABLE,RED and the CABLE,BLACK in the CRT SOCKET.
Put in and soldering(back side) the CABLE,GLAY in the CRT PWB.



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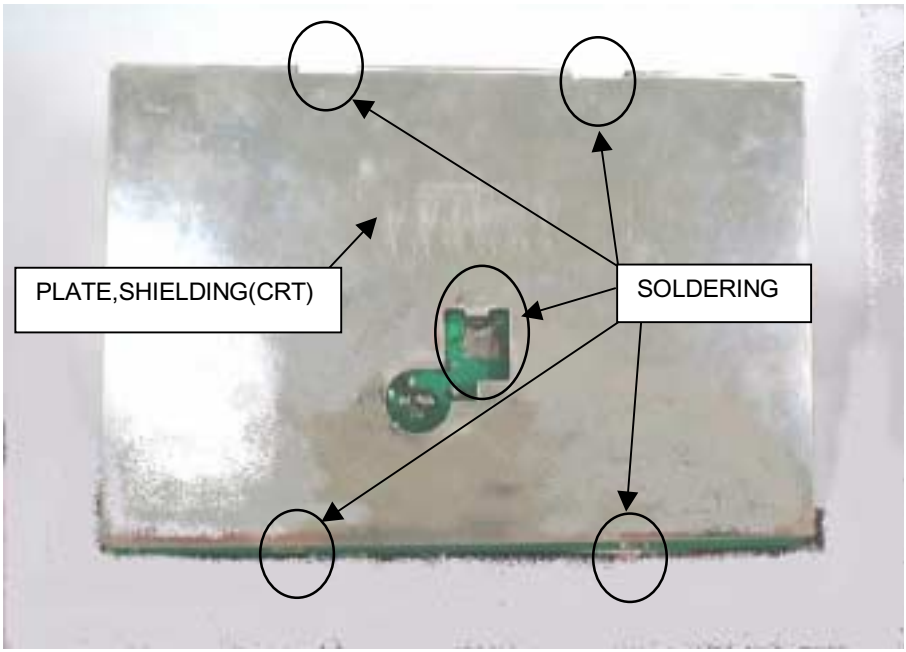
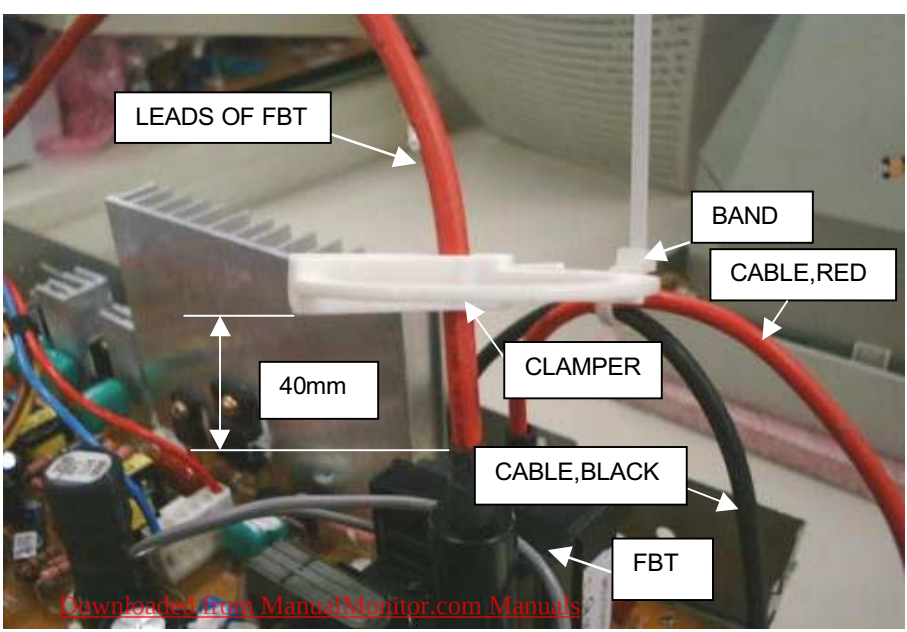
23. Soldering(6point) the PLATE,SHIELDING(CRT) on the CRT PWB.



24. Clamp the leads of FBT with the EDGE SADDLE.
Tie the CABLE,BLACK and CABLE,RED to the BAND with the EDGE,SADDLE.



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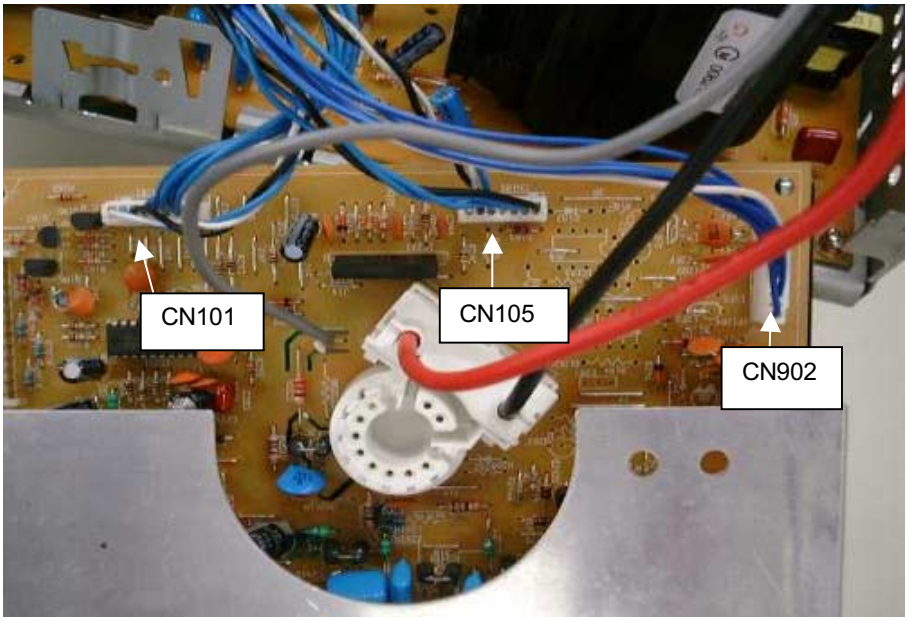
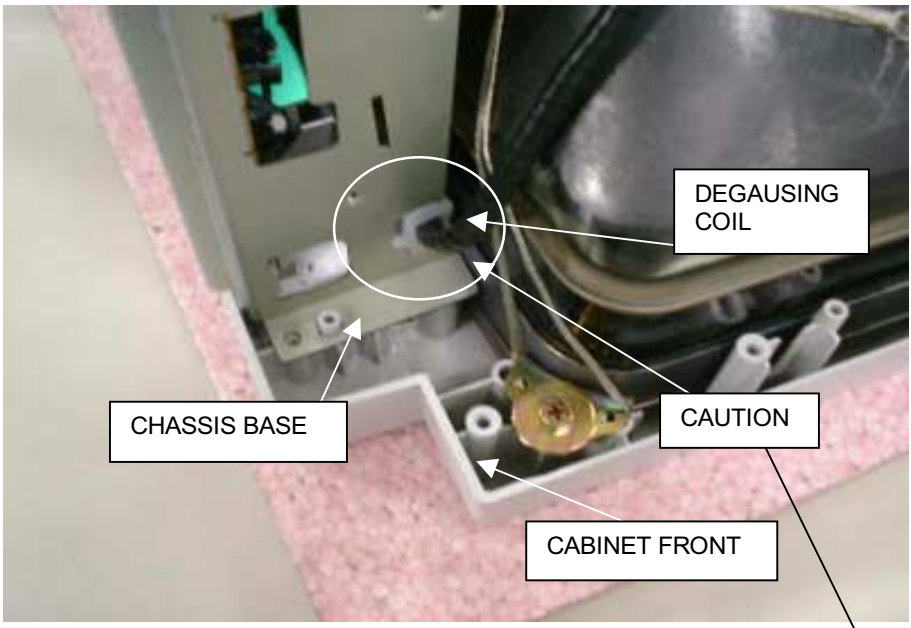
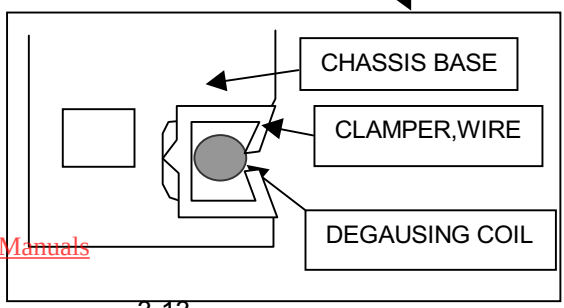
25. Connect CN101,CN105 and CN902 on the CRT PWB.



26. Mount and screw CHASSIS BASE on the CABINET FRONT ASSY.



Caution: DEGAUSING COIL put in the CLAMPER,WIRE.



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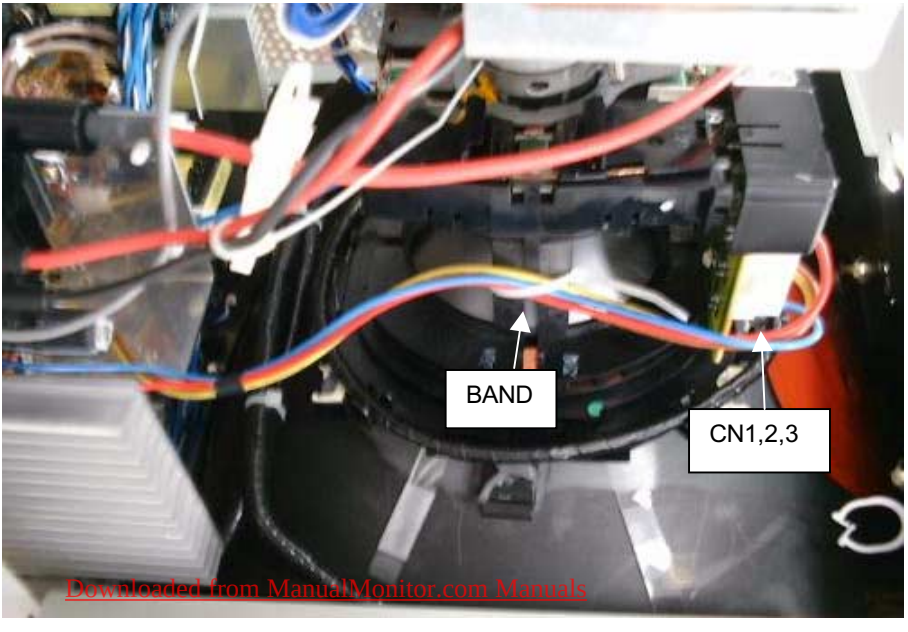
27. Mount and screw CHASSIS BASE on the CABINET FRONT ASSY.

28. Connect CN1, 2, 3 on the CRT.
Tie the CN1,2,3 to the BAND with the CRT's hook.



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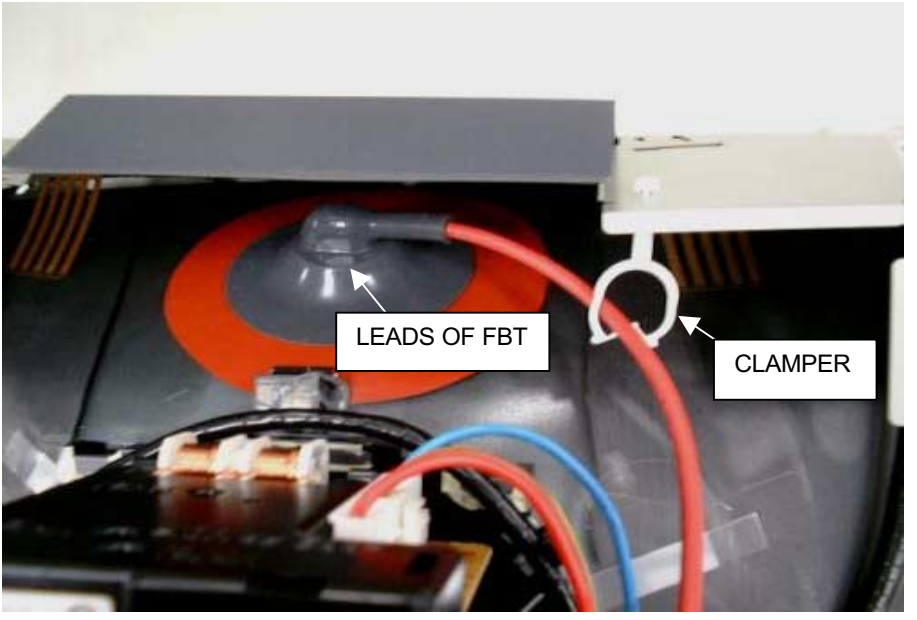
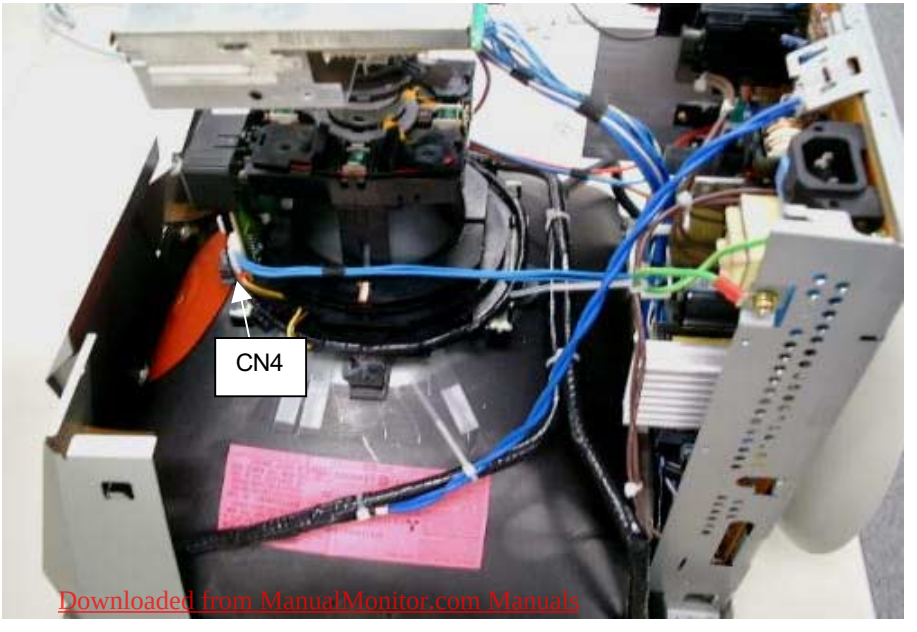
29. Put the leads of FBT on the CRT.Put in the leads of FBT in the CLAMPER.



30. Connect CN4 on the CRT.



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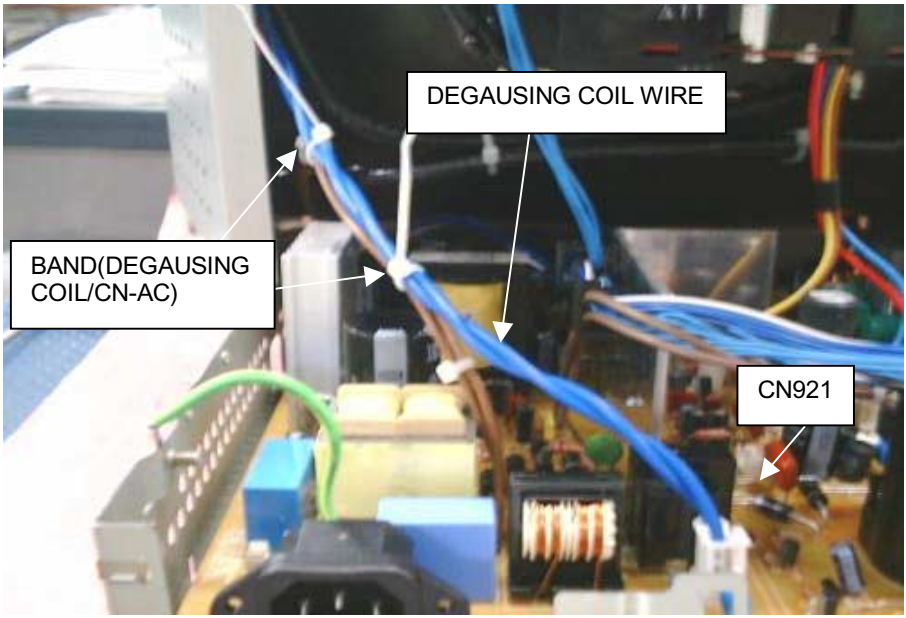
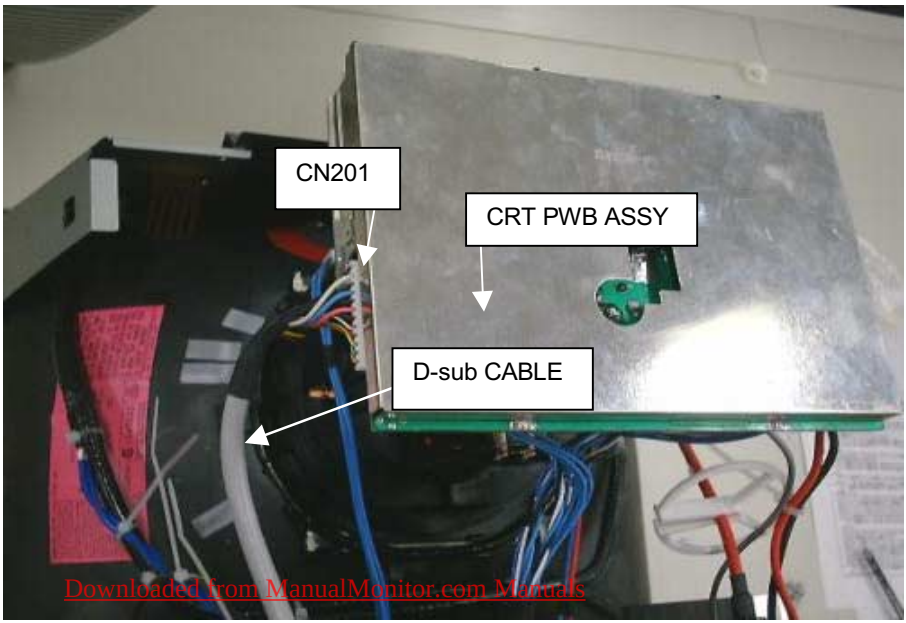
31. Tie DEGAUSING COIL WIRE and CN-AC CABLE with BAND(2point).



32. Put in the CRT PWB on the CRT.
Put in the D-sub cable in the CRT PWB.



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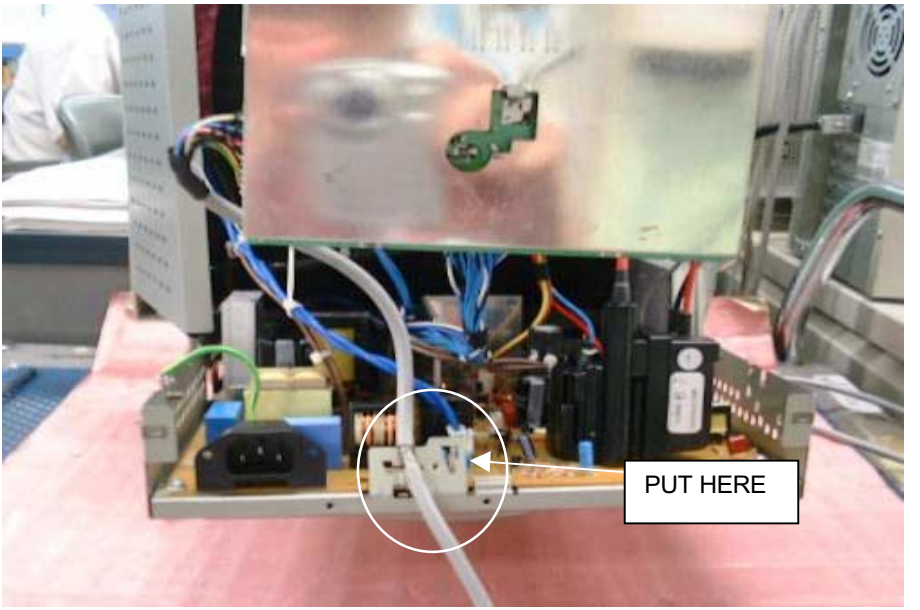
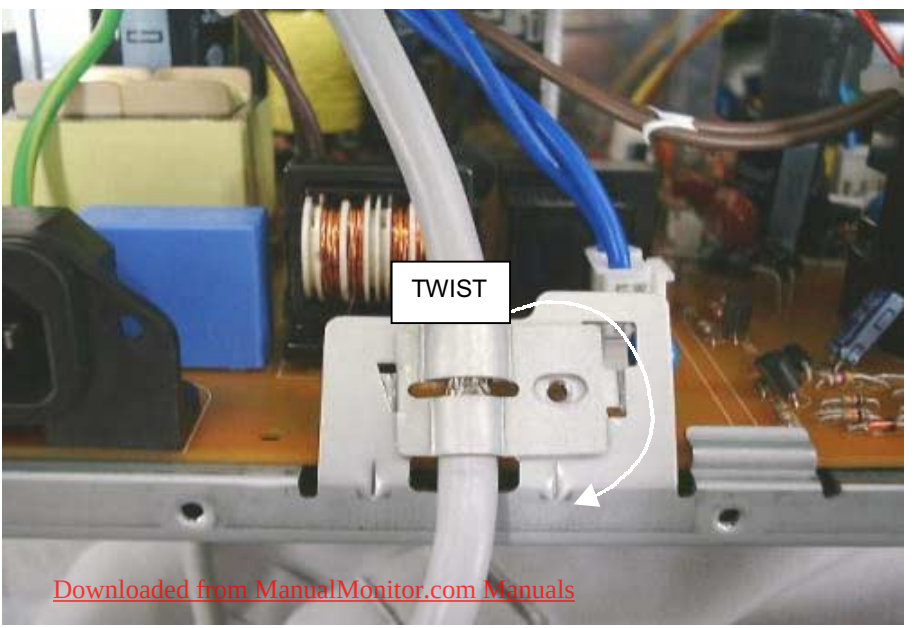
33. Put the D-sub cable on the CHASSIS BASE.



34. Put in and screw HOOK on the CHASSIS BASE.



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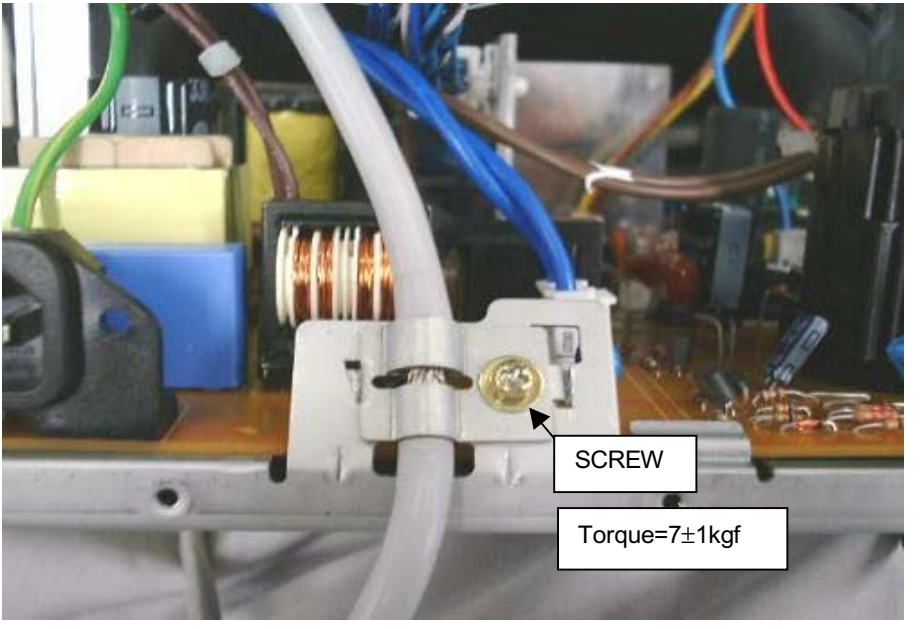
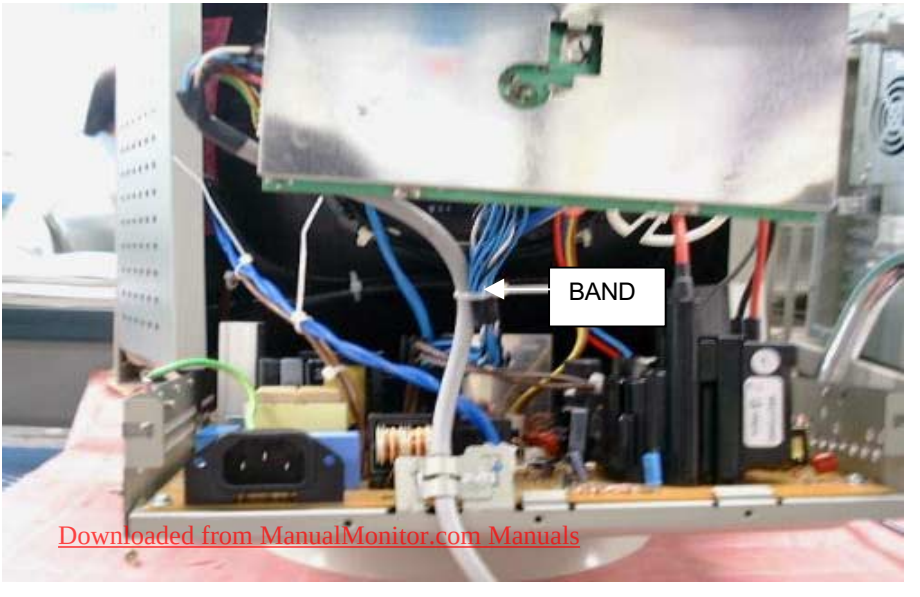
35. Put in and screw HOOK on the CHASSIS BASE.



36. Tie D-sub cable and CN101,102,901 wire with BAND.(1point)



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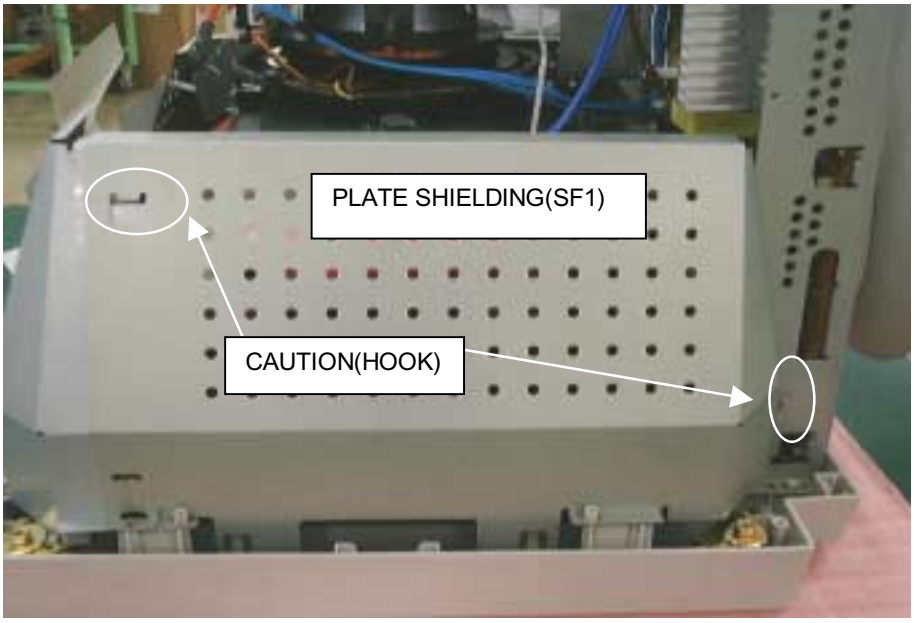
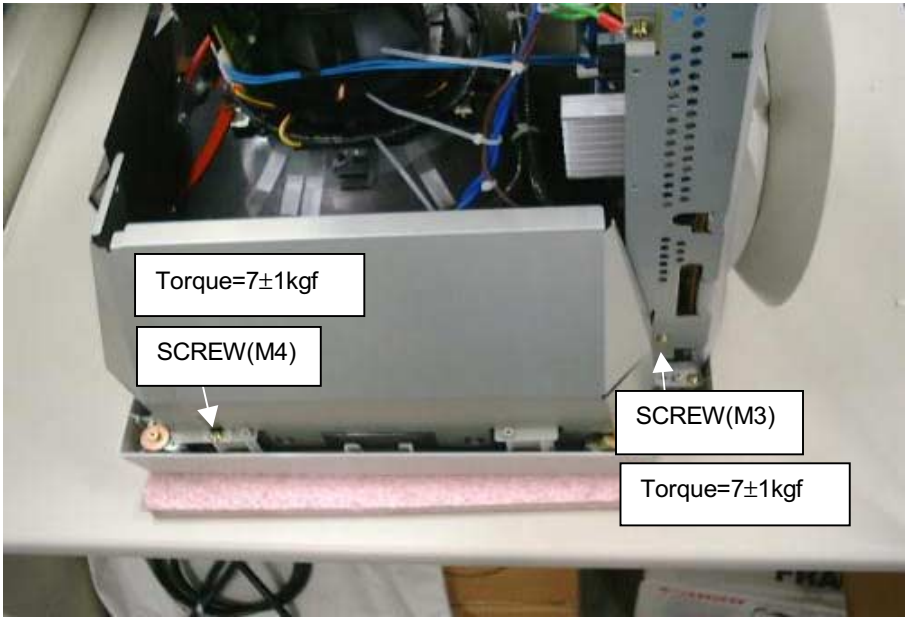
37. Put and screw the PLATE SHIELDING (SF1) to the CABINET FRONT ASSY.(2point)

Caution: PLATE SHIELDING(SF1) hook area put in the PLATE SHIELDING(FRONT) and CHASSIS BASE.(2point)



38. Put and screw the PLATE SHIELDING(SF1) to the CABINET FRONT ASSY.(2point)



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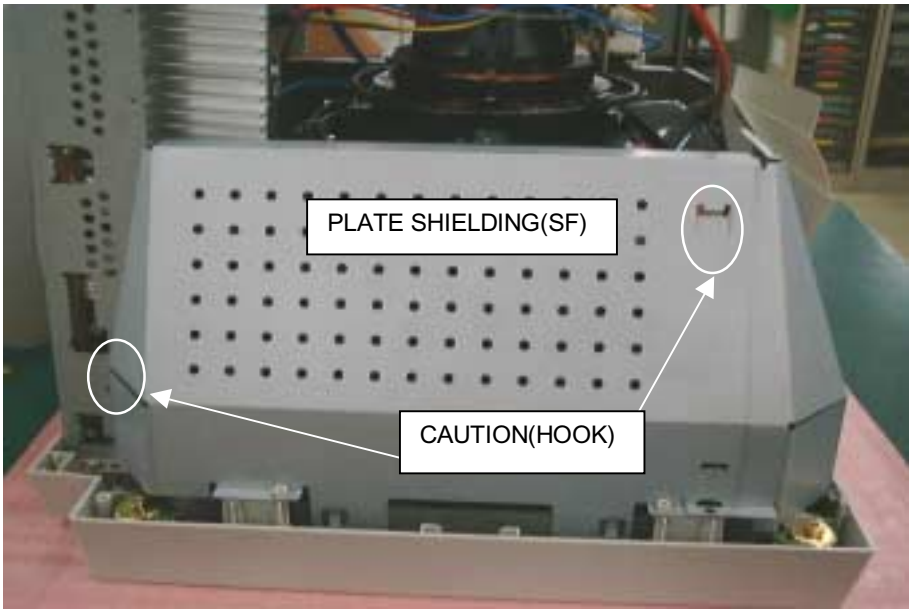
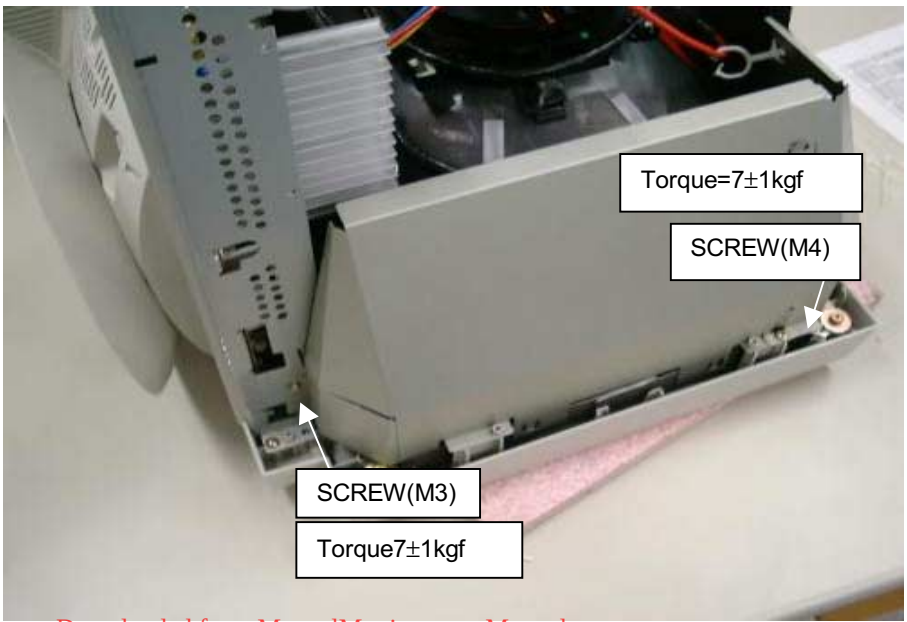
39. Put and screw the PLATE SHIELDING (SF) to the CABINET FRONT ASSY.(2point)

Caution: PLATE SHIELDING(SF) hook area put in the PLATE SHIELDING(FRONT) and CHASSIS BASE.(2point)



40. Put and screw the PLATE SHIELDING (SF) to the CABINET FRONT ASSY.(2point)



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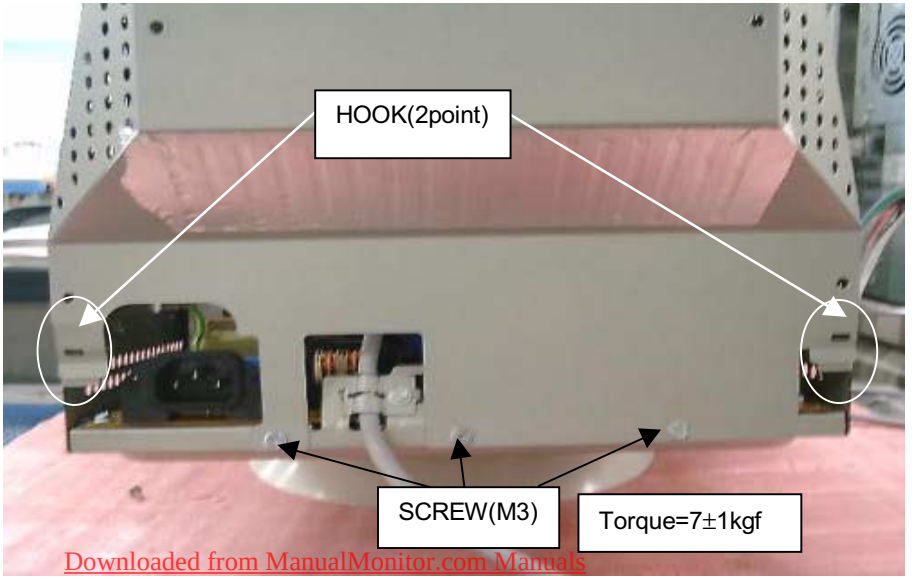
41. Put on the PLATE SHIELDING ASSY on the desk.
Put on the LEAF SPRING BACK on the PLATE SHIELDING ASSY.

42. Put in and screw PLATE SHIELDING ASSY on the CHASSIS BASE.(5point)
Caution: PLATE SHIELDING ASSY hook area put in the CHASSIS BASE.(2point)



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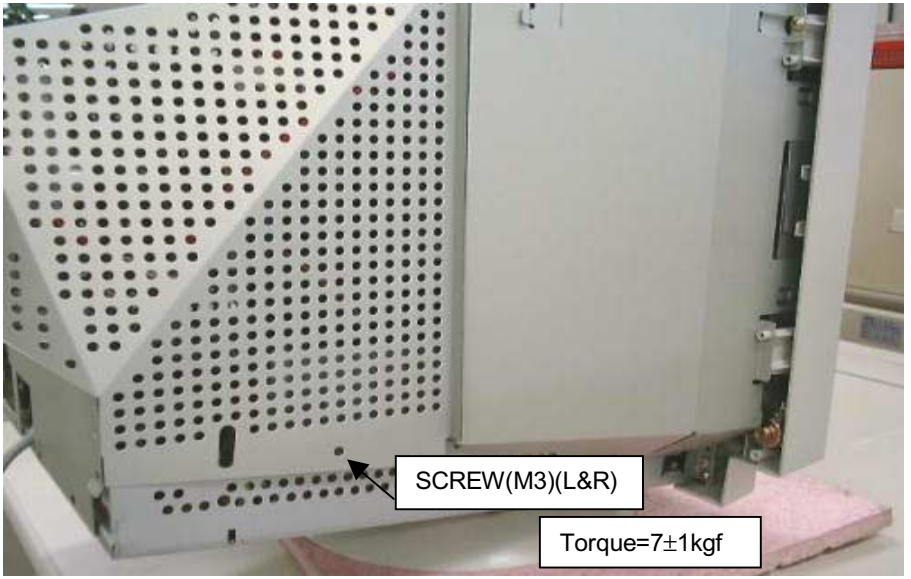
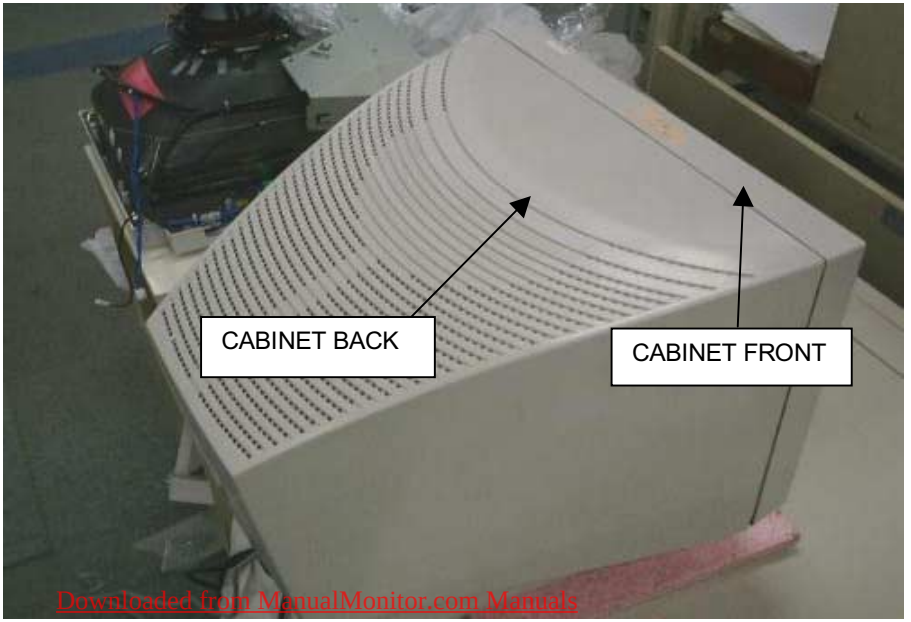
43. Put and screw PLATE SHIELDING ASSY on the CHASSIS BASE.(5point)



44. Put and screw CABINET BACK on the CABINET FRONT ASSY.(2point)



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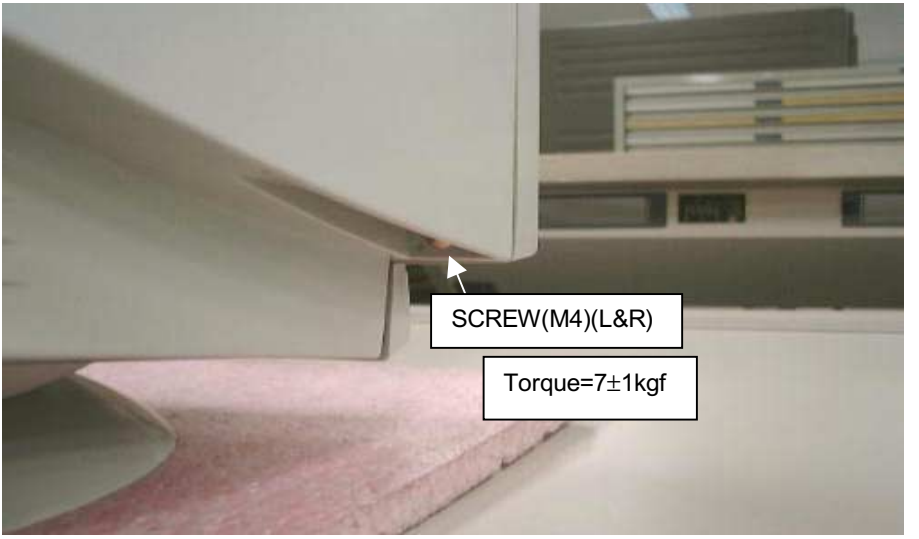
45. Put and screw CABINET BACK on the CABINET FRONT ASSY.(2point)



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ADJUSTMENT PROCEDURES

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I. SCOPE OF APPLICABILITY

The following adjustment specifications are applicable to adjustment of the model DP730 17 inch color display.

Sets subject to adjustment are to be assembled in accordance with the work layouts.

In this document, we state these sets like the followings instead of model name.

MODEL NAME : Diamond Pro730

MODEL NUMBER : JC-17W41

In this document, we omit the first 5 or 6 characters in the model name and only state the version code or the version code and CRT code.

" B " or " B version" : mainly for European countries in northern hemisphere. { B }

II. STANDARD ADJUSTMENT CONDITIONS

1. Power Supply Voltage

B version : AC 220V ± 5% 50Hz

2. Aging

The adjustment shall be made after more than 30 minutes of heat run Self Test Mode. (Refer to section 7-5-3)

3. Signals

Video : Analog 0.7 ± 0.01 Vp-p Positive polarity (75 Ω ± 1%, terminated)

Sync. : TTL Level (High level : more than 2.4V, Low level : less than 0.8V)

H/V Separate Positive : Negative Polarity

or

H/V Composite Positive : Negative Polarity

4. Magnetic Field Conditions During Adjustment

Unless otherwise specified, set the magnetic field to the following.

Magnetic field	Vertical	Horizontal
B version	40 ± 1uT	0 or 30 ± 1uT

Degauss the entire unit with an external degaussing coil before beginning the adjustment procedure.

* Notes about degaussing method

Follow the degaussing procedure below. (To prevent intertwinement of aperture grille.)

In case receiving vertical frequency is same with external degaussing coil frequency change vertical frequency to prevent set magnetizing.

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1) Use cylinder -shaped degaussing coil. Do not use ring degaussing coil except degaussing chassis.

2) In order to remove a magnetization from top sides, base shield and chassis, degauss each side. Do not switch off the degaussing coil abruptly.

Move the degaussing coil slowly when degaussing.

Note: If switch off the degaussing coil near the set, the set is magnetized.

3) To degauss panel surface

When switch on the degaussing coil, keep distance between panel surface and degaussing coil to more than 50cm.

Move the degaussing coil vertically near the panel surface.

Keep distance of panel surface and degaussing coil to more than 15mm.

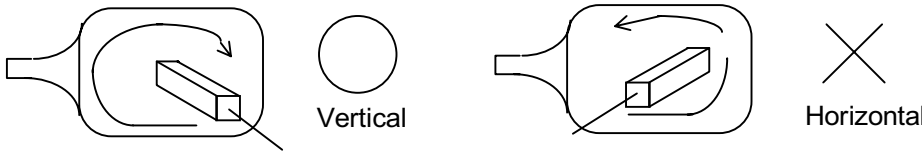

Fig. 4-1

4) Degaussing method of CRT surface

Starting from edge of CRT, move the degaussing coil toward CRT center in circular motion, spending 6 to 7 seconds. (about 4 or 5 rounds)

5) After sufficiently degaussing the CRT, move degaussing slowly away from the panel surface while rotating from corner to center, taking more than 3 seconds.

Turn off SW more than 1m away from the CRT.

Degauss again if the unit is magnetized.

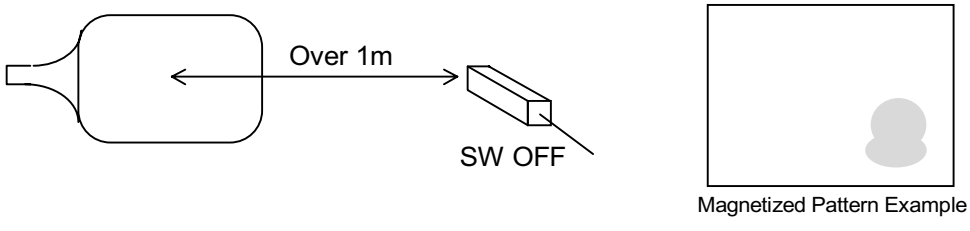

Fig. 4-2

6) When aperture grille get entangled while degaussing, receive the signal of 1dot alternate pattern and degauss again. If aperture grille remain entangled, Put vibration from side.

5. Signal Generator

LVG-1603 is recommended for signal generator.

Use calibrated signal generators. However, use VG-819 in focus regulation.

Note) Adjustment timings are on timing tables and are not programmed timing.

6. Color Analyzer, Convergence Meter, Landing Mater

The color analyzer should be CA-100 (made by MINOLTA) or compatible.

The convergence meter should be CC-100 (made by MINOLTA) or compatible.

The Landing meter should be KLD-01 (made by KAMAYA) or compatible.

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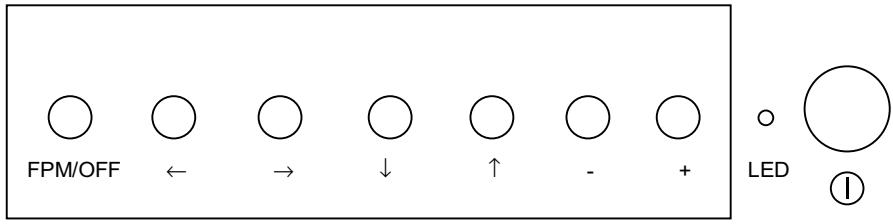
7. OSD MENU

7-1. FRONT PANEL



7-2. ADJUST MENU

This model is adjusted through On Screen Display by operating the front panel switch.

On Screen Display menu is divided into the following 2 types(1) and 2)).

1) MENU (USER) : Menu containing items that can be operated by user.

2) MENU (SERVICE) : Menu that is hidden from user.

Hereafter, they will be called MENU (U),MENU(S).

The menu can be displayed when the Signal input to the Display unit.

7-3. FACTORY MODE

This model has function that is named "FACTORY MODE"

Adjust preset data in this mode.

Reset function is disable.

Set the factory mode to the ON condition before adjustment. Set the factory mode to OFF (User Mode) after completing.

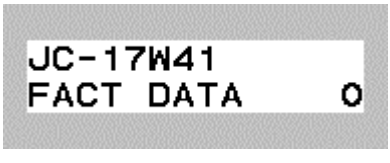
7-4. FACTORY MODE SETTING

7-4-1. FACTORY MODE : OFF → ON

1) Power on pressing “FPM”.

2) After screen image is appear, release “FPM” and press “FPM” again.

Then the following menu is displayed.



3) Adjust data 255 with ”-“.

4) Adjust data 5 with ”+“.

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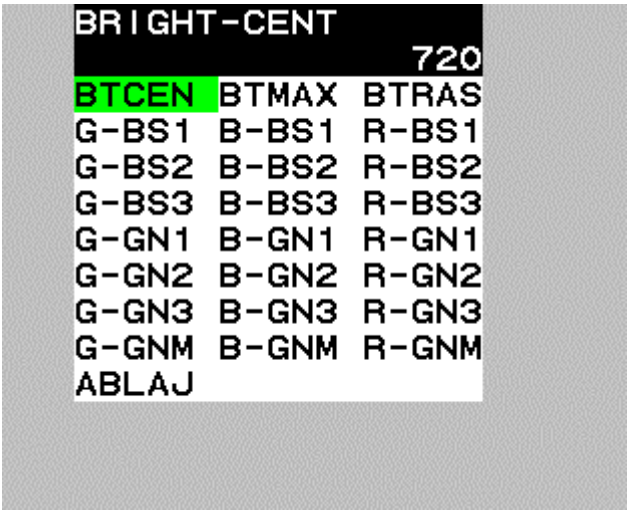
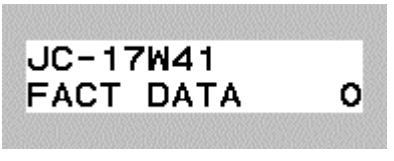
5) Press “→”, then enter to factory mode.

And the following menu is displayed.



7-4-2. FACTORY MODE ON → OFF

1) Open the following menu.



2) Adjust data 10 with “-“ or “+”.

3) Press “→”, then escape from FACTORY MODE.

7-5. Displaying the OSD.

7-5-1 MENU(U) : Press one SW of "←", "→","↓", “↑”, "-" or "+" once.

7-5-2 MENU(S) : Press one SW of "←", "→","↓", “↑”, "-" or "+" once.

7-5-3 Self Test : Open (Menu (U), Group 6) “POWER SAVE” menu and set this function OFF.

7-6. How to turn off OSD MENU

* To close the Menu

  Press “FPM” switch while MENU(U) or MENU(S) is displayed

* To close MENU temporarily.

  This function is not available.

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7-7.To change Group / ITEM / SUB MENU

Group to Group : Push “←” SW or “→” SW.

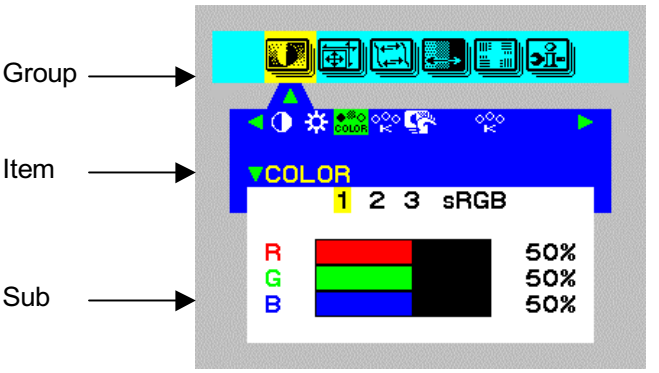
Group to Item : Push “↓” SW.

Item to Sub Menu : Push “↓” SW.

Item to Item : Push “←” SW or “→” SW.

Sub Menu to Item : Push “↑” SW.

Item to Group : Push “↑” SW.



7-8. To change Data values

Data values are changed by pressing "-" or "+" switch.

7-9. To save Data Value.

Data values are saved into EEPROM, when “-“ or ”+” is released.

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7-10. Structure of OSD MENU

7-10-1. OSD MENU (U)

Group	Item	Item Name
Group 1		CONTRAST
		BRIGHT
	COLOR	COLOR
	K	COLOR TEMPERATURE
		RESET
Group 2		HORIZ-SIZE
		HORIZ-PHASE
		VERT-SIZE
		VERT-POSITION
		ROTATION
	GTF AUTO	GTF AUTO ADJUST
		RESET
Group 3		PINCUSHION
		PIN-BALANCE
		KEYSTONE
		KEY-BALANCE
		TOP-PIN
		BOTTOM-PIN
		RESET
Group 4		MOIRE CANCEL LEVEL
	CLAMP	CLAMP PULSE POSITION
		RESET
Group 5		HORIZ-CONVERGENCE
		VERT-CONVERGENCE
		RESET
Group 6		DEGAUSS
		POWER SAVE
		CONTROL LOCK
		OSD POSITION
	OFF	OSD TURN OFF
	INFO	DIAGNOSIS
		LANGUAGE
	AUTO SAVE	AUTO SAVE
	ALL RESET	ALL RESET
		RESET

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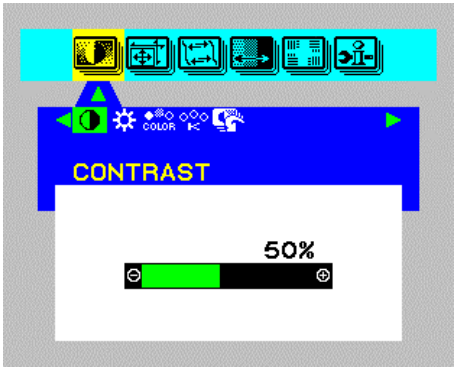
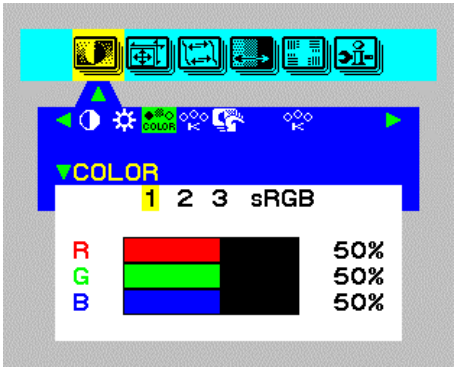
Group 1





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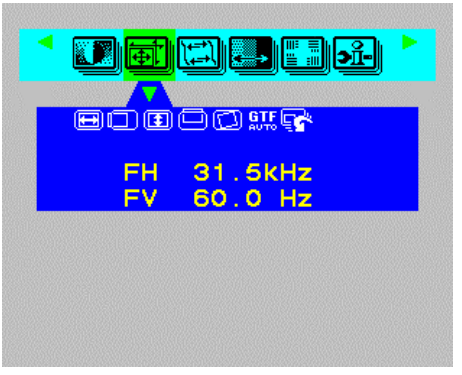
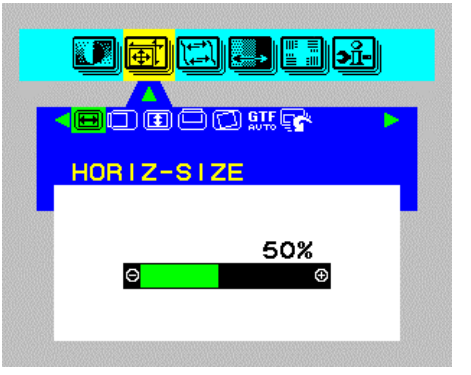
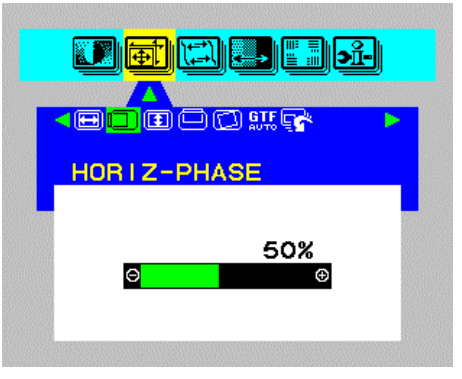
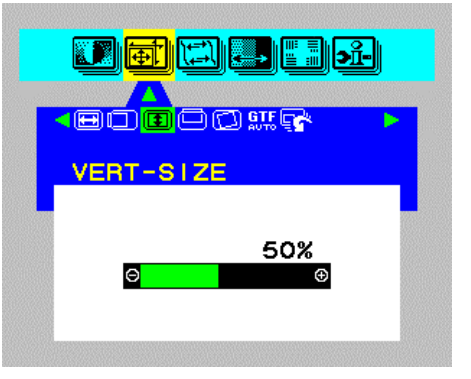
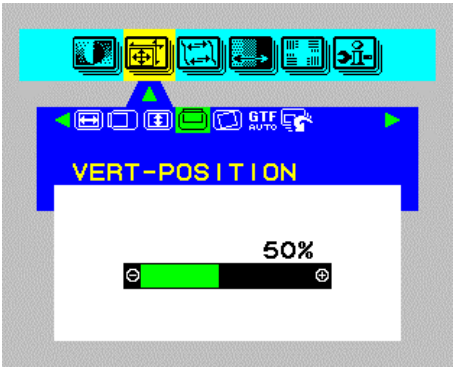
Group 2

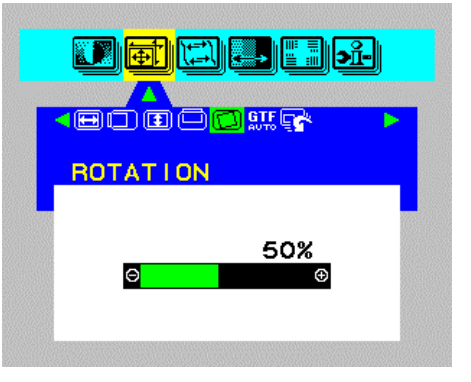


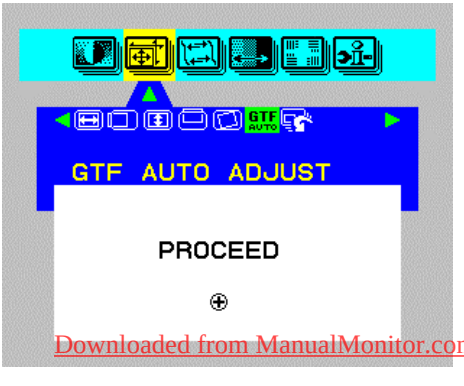


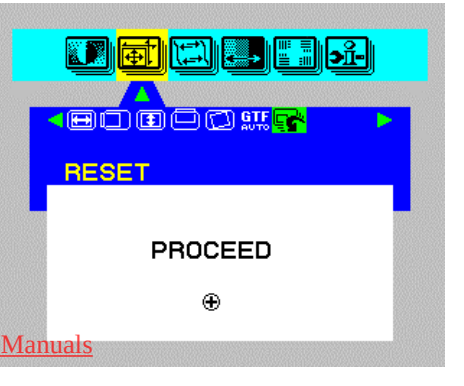












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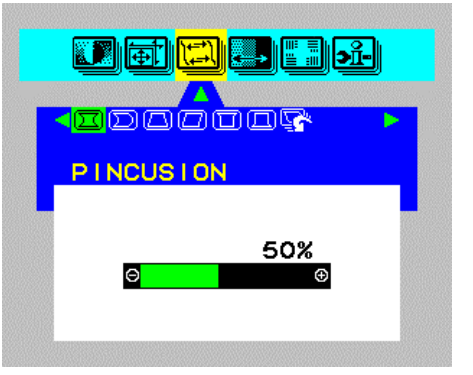
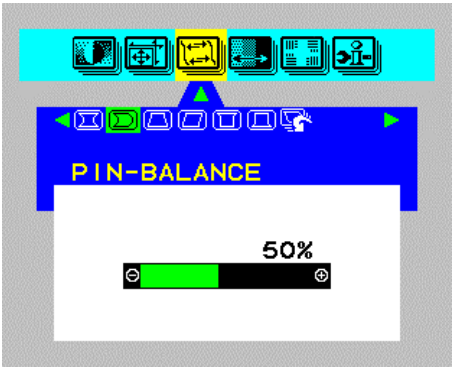
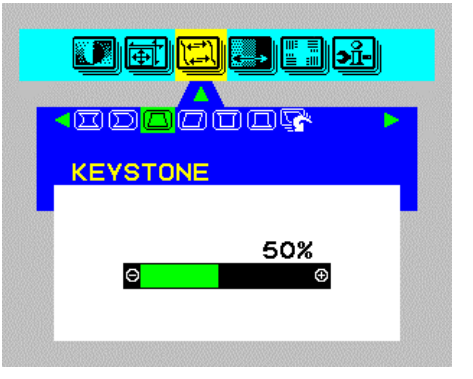
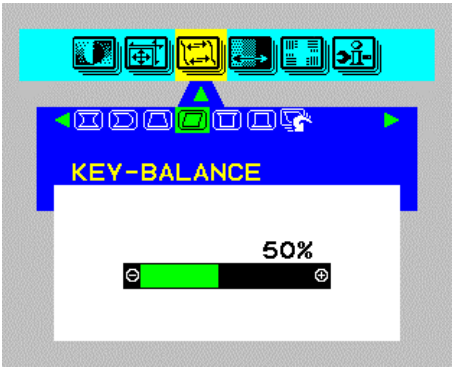
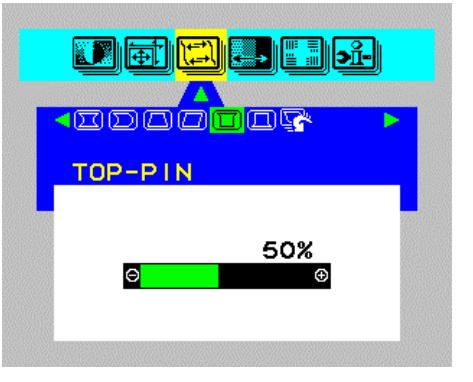
Group 3

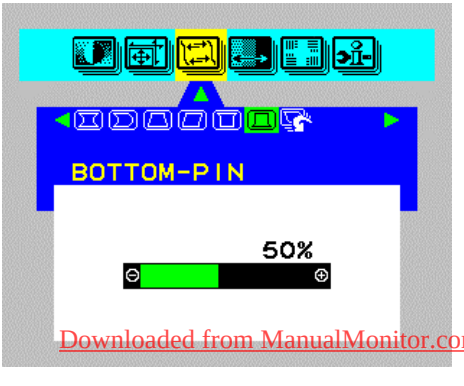












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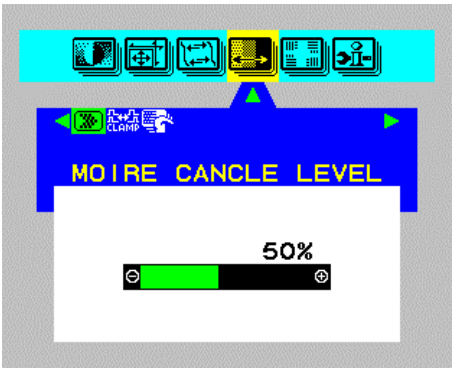

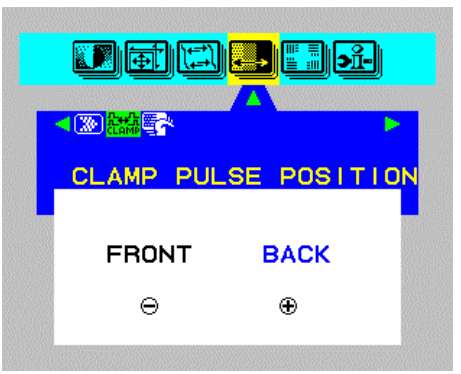

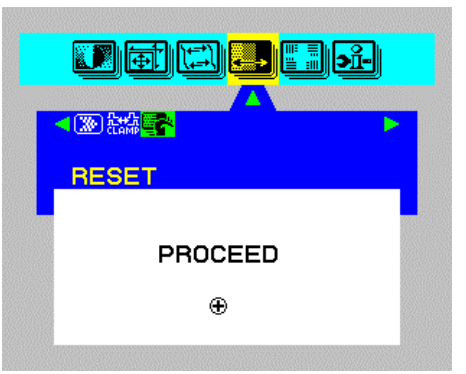

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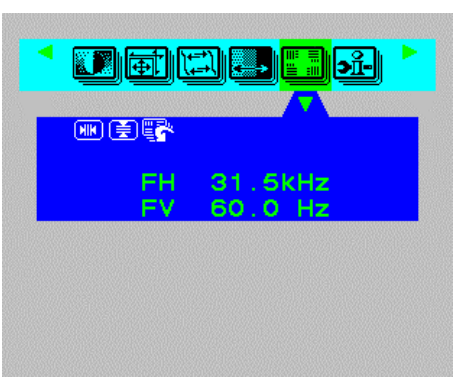

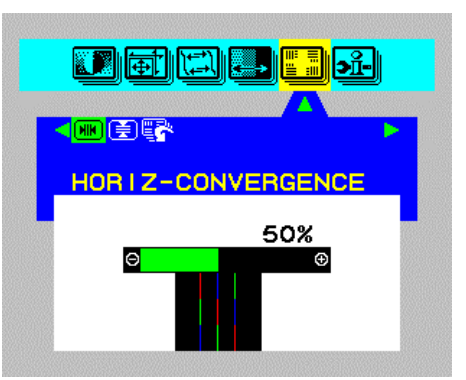

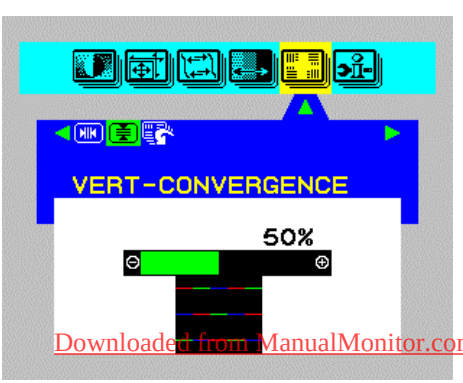

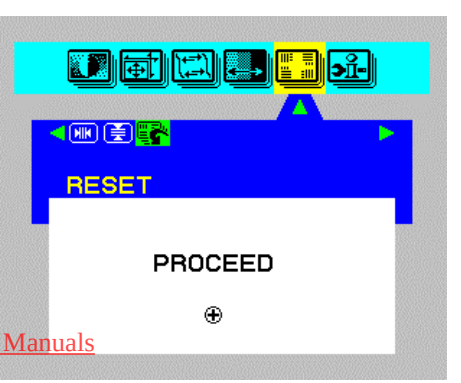

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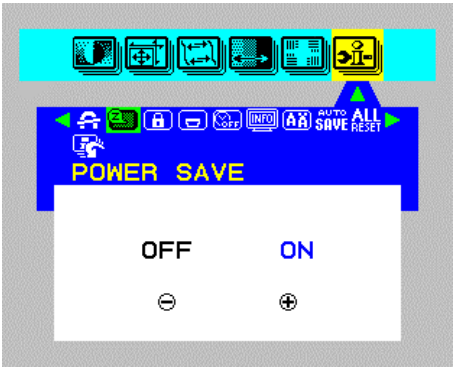
Group 6



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7-10-2 OSD MENU (S)

Group	Item	Item Name
Group 1		CONTRAST
		BRIGHT
	COLOR	COLOR
		COLOR TEMPERATURE
		RESET
Group 2		HORIZ-SIZE
		HORIZ-PHASE
		VERT-SIZE
		VERT-POSITION
		ROTATION
	GTF AUTO	GTF AUTO ADJUST
		RESET
Group 3		PINCUSHION
		PIN-BALANCE
		KEYSTONE
		KEY-BALANCE
		TOP-PIN
		BOTTOM-PIN
		RESET
Group 4		MOIRE CANCEL LEVEL
	CLAMP	CLAMP PULSE POSITION
		RESET
Group 5		HORIZ-CONVERGENCE
		VERT-CONVERGENCE
		RESET
Group 6		DEGAUSS
		POWER SAVE
		CONTROL LOCK
		OSD POSITION
	OFF	OSD TURN OFF
	INFO	DIAGNOSIS
		LANGUAGE
	AUTO SAVE	AUTO SAVE
	ALL RESET	ALL RESET
		RESET

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Group	Item	Item Name
Group 7	BTCEN	BRIGHT-CENT
	BTMAX	BRIGHT-MAX
	BTRAS	BRIGHT-RAS
	G-BS1	G-BIAS-H
	B-BS1	B-BIAS-H
	R-BS1	R-BIAS-H
	G-BS2	G-BIAS-M
	B-BS2	B-BIAS-M
	R-BS2	R-BIAS-M
	G-BS3	G-BIAS-L
	B-BS3	B-BIAS-L
	R-BS3	R-BIAS-L
	G-GN1	G-GAIN-H
	B-GN1	B-GAIN-H
	R-GN1	R-GAIN-H
	G-GN2	G-GAIN-M
	B-GN2	B-GAIN-M
	R-GN2	R-GAIN-M
	G-GN3	G-GAIN-L
	B-GN3	B-GAIN-L
	R-GN3	R-GAIN-L
	G-GNM	G-GAIN-MAX
	B-GNM	B-GAIN-MAX
	R-GNM	R-GAIN-MAX
	ABLAJ	ABL
Group 8	HVADJ	HV-ADJ(CAUTION)
	X-ADJ	XPRO-ADJ(CAUTION)
	XPROT	XPRO-TST(CAUTION)
	HFOCS	H-FOCUS
	VFOCS	V-FOCUS
	HFOCD	H-FOCAD
	V-BAL	V-LIN-BAL
	V-LIN	V-LIN
	HDUTY	H-DUTY
	HVZER	MAG-ZERO-HV

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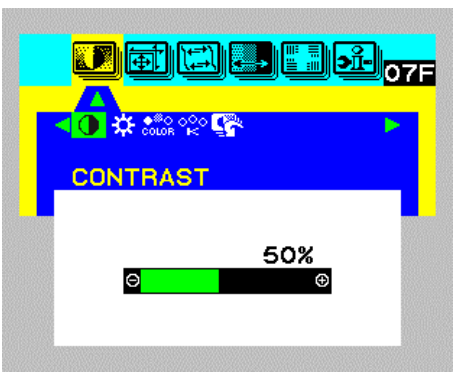
Group	Item	Item Name
Group 8	H-PUR	H-PURITY
	V-PUR	V-PURITY
	SOG-E	SYNC-ON-GREEN
	PRDIS	PURITY-DIS
	WPDOC	DDC-EEP-WP
	TPBAL	TOP-PIN-BAL
	BPBAL	BOTTOM-PIN-BAL
	GTFHS	GTF-H-SIZE
	GTFHP	GTF-H-POSI
	GTFVS	GTF-V-SIZE
	GTFVP	GTF-V-POSI

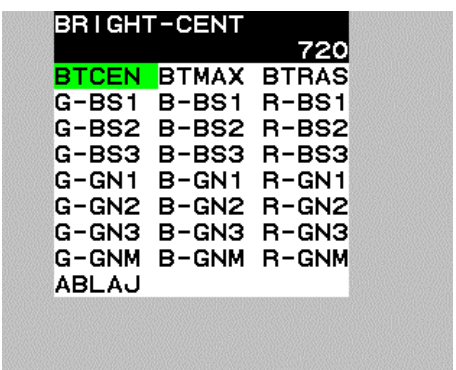
Group 1-6

Group 1-6 are almost same as MENU(U).

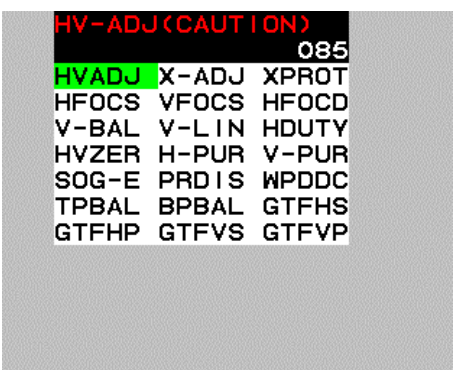
The difference between MUNE(U) and MENU(S) is center yellow line.



Group 7



Group 8



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ADJUSTMENT ITEMS

[A] Pre-Adjustment

1. High-Voltage Adjustment (SAFETY) (When circuit board energizing is examined.)
2. Screen-Voltage Adjustment

[B] VR Initial Settings

1. Control Setting

[C] Main Adjustment

1. Vertical Linearity Adjustment
2. Horizontal Raster Position Adjustment
3. Deflection Distortion Adjustment
   - 3-1. Horizontal / Vertical Size Rough Adjustment
   - 3-2. Picture Tilt Adjustment
   - 3-3. Side Pincushion Balance Adjustment
   - 3-4. Side Pincushion Adjustment
   - 3-5. Trapezoid distortion Adjustment
   - 3-6. Parallelogram Distortion Adjustment
   - 3-7. Corner Distortion Adjustment
     - 3-7-1. Top Corner Distortion Adjustment
     - 3-7-2. Bottom Corner Distortion Adjustment
     - 3-7-3. Top Corner Balance Adjustment
     - 3-7-4. Bottom Corner Balance Adjustment
   - 3-8. Overall Distortion Adjustment
4. Preset Picture Size and Position Adjustment
5. Video Amplitude Adjustment
   - 5-1. Settings
   - 5-2. Cut Off Adjustment
   - 5-3. Color Preset Adjustment
   - 5-4. ABL Adjustment
   - 5-5. sRGB Adjustment
6. Focus Adjustment
   - 6-1. Focus VR Adjustment
   - 6-2. V-FOCUS Adjustment
7. Convergence Adjustment

[D] Reference

1. List of Signals
2. Signal timing Charts
3. Position of Connectors and Test point for Adjustment and Inspection

(SAFETY) : This MARK is important adjustment item for products safety.

*A. Adjustment of Section 1 and section 2 shall be done at the time of inspection to flow electricity in PWB.

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[A] Pre-Adjustment

1. High-Voltage Adjustment SAFETY

Signal 3 (VGA480), Frame Pattern

Initial Setting

SCREEN VR: Raster Just cut off

This adjustment is made when circuit board energizing is examined.

1) Receive signal 3(VGA480), Frame Pattern

2) Open Menu (S), Group8) "HV-ADJ" and adjust that high-voltage is the following by "+", "-" button

25.0kV ± 0.3kV

2. Screen-Voltage Adjustment

Signal 3 (VGA480), Frame Pattern

1) Receive Signal 3 (VGA480), Frame Pattern

2) Open Menu (S), Group 7) and set the values of the following.

BRIGHT-CENT : A00h

R-BIAS-H (9300K) : 80h

G-BIAS-H (9300K) : 80h

B-BIAS-H (9300K) : 80h

3) Adjust SCREEN VR slowly so that Screen voltage is the following.

704V ± 2V

[B] VR Initial Settings

1. Control Setting

Before adjusting, set the position of control as follows.

FBT FOCUS F1 : Mechanical center

FOCUS F2 : Mechanical center

VR581 : Mechanical center

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[C] Main Adjustment

*Close OSD menu before the set turn the power off.

*Turn the monitor back on and confirm that the adjustment values / contrast / white balance / distortion values are the same before the Menu was closed.

When "FPM/OFF" SW is pushed by the condition which OSD is displayed,

OSM Menu will disappear. If " →, ← ,↑, ↓ " SW is pushed once more, OSD displays.

Previous setting

1) FOCUS VR setting

Signal 3 (VGA480), Crosshatch

Display OSD menu and adjust FOCUS F1 VR and F2 VR to be able to recognize characters.

2) Rough Adjustment before warm up

Signal 19 (1600*1200@75)

a. Rough adjustment of horizontal raster position

1) Receive following signal , All Black.

Signal 19 (1600*1200@75)

2) Make sure to set the position of control as follows.

VR581 (on the MAIN PWB) : Mechanical center

3) Open Menu (S),Group 2) "HORIZ-SIZE", adjust "+", "-" SW so that the horizontal raster size is the followings,

a : 315 ± 5.0mm

4) Adjust VR581 so that the distance between the bezel and raster edge is as follows.

$| XL_{eft} – XR_{ight} | \leq 3.0$ mm

b. Initial DATA Writing

Before aging, Initial data must be written in EEPROM by using a data file

" CX980_1.eep".

But, High Voltage data (address 0x00aa to 0x00ae) must not be changed.

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1. Vertical Linearity Adjustment

Signal 22 (V.RASTER) Inverted Crosshatch

Signal 1 (VGA350) Inverted Crosshatch

1) Open Menu (S),Group 2) “VERT-SIZE” “VERT-POSITION”, and adjust “+”, “-“ SW so that the vertical size and position becomes the following. (Refer to Fig. 2-1.)

X : 236 ± 3.0mm

| Ytop – Ybottom | ≤ 1.0 mm

2) Open Menu (S),Group 8) “V-LIN-BAL", and adjust “+”, “-“ SW so that the size of top square and bottom square on the screen equal vertically.

3) Open Menu (S),Group 8) “V-LIN", and adjust “+”, “-“ SW so that the size of top square and center square on the screen equal vertically.

4) Make sure that the linearity of top, center and bottom on the screen are ±3% or less.

5) Receive Signal 1.

6) Repeat 1) to 5)until meet the spec.

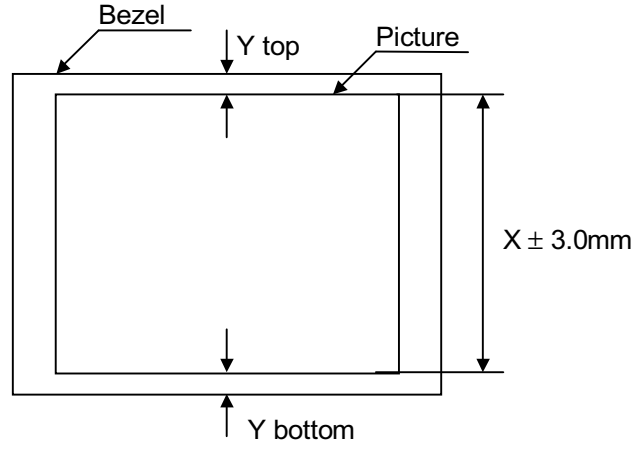

Fig. 1-1 Vertical Raster Size

7) Calculate values of another signal data using above data and write memory.

2. Horizontal Raster Position Adjustment

Signal: 19 (1600*1200@75) All Black

1) Receive signal the following Signal 19, All Black.

2) Open Menu (S), Group 7) "BTRAS", push "+" SW, until horizontal raster appear.

3) Make sure to set the position of control as follows.

VR581 (on the MAIN PWB) : Mechanical center.

4) Open Menu (S), Group 2) "HORIZ-SIZE", adjust "+", "-" SW so that the

horizontal raster size is the followings,

a : 315 ± 5.0mm

5) Adjust VR581 so that the distance between the bezel and raster edge is as follows.

$| XL_{eft} – XR_{ight} | \leq 2.0$ mm

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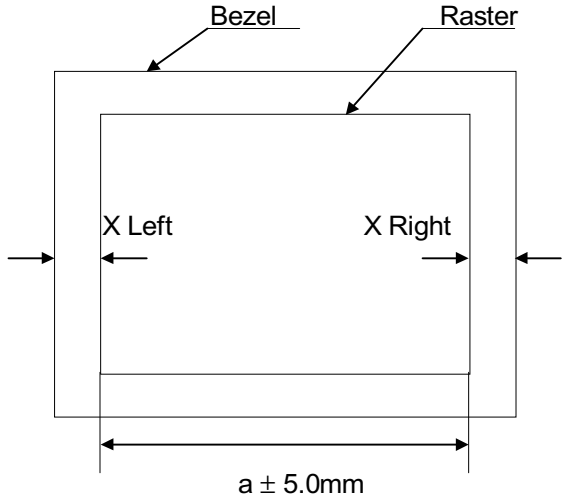

Fig. 2-1 Horizontal Raster Centering

3. Deflection Distortion Adjustment

Signal 11 (800*600@85Hz)

Signal 20 (1280*1024@85Hz)

Refer to Table 4) in next section.

Environment : Adjustment Magnetic Field by three dimension magnetic field system.

Degauss the monitor using an external degaussing coil. (See item II-4)

* Hide the OSD menu when confirm the distortion.

When adjustment is finished, close menu to store the data values.

*After 3-1 section and 3-2 section are adjusted, redo adjusts 3-3 section to 3-8 section in the case of the manual adjustment.

When distortion left at the top-bottom corner, the adjusted of 3-9 section is done, and 3-10 section is confirmed at the end.

3-1. Horizontal / Vertical Size Rough Adjustment

1) Receive the following signals, All White.

Signal 11 (800*600@85Hz)

Signal 20 (1280*1024@85Hz)

2) Open Menu (S), Group 2) “HORIZ-PHASE”, “VERT-POSITION”, “HORIZ-SIZE” and “VERT-SIZE” and adjust the screen size to the following values.

Horizontal Size: 315 mm ± 5.0 mm

Vertical Size: 236 mm ± 5.0 mm

Horizontal Picture Position: | Xleft - XRight | ≤ 3.0 mm

Vertical Picture Position: | XTop - XBottom | ≤ 3.0 mm

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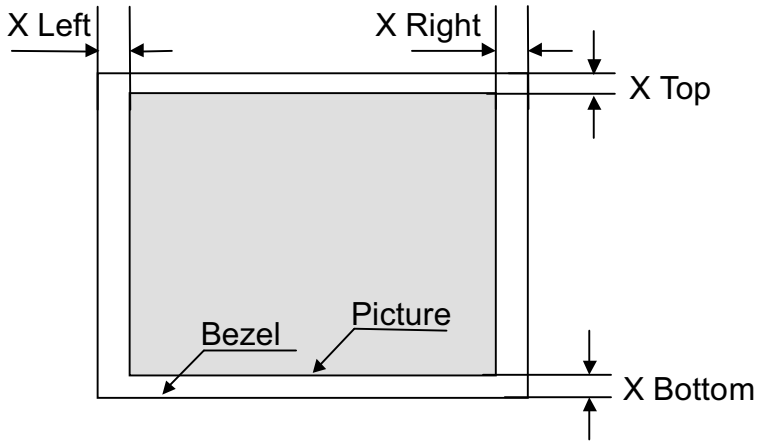

Fig. 3-1 Screen Size Rough Adjustment

3-2. Picture Tilt Adjustment

1) Receive signal 20 (1280*1024@85Hz), Crosshatch Pattern
2) Open Menu (S), Group 2) “ROTATION” and make sure that initial value of adjustment data is "87h".
3) Degauss the monitor using an external degaussing coil. (See item II-4)
4) Open Menu (S), Group 2) “ROTATION” and make sure that the picture is tilted as follows by "+", "-" SW.

   "-" SW: counterclockwise

   "+" SW: clockwise

   The count of OSM : 40h ~ C0h
5) Adjust "+", "-" SW so that the picture tilt meets the following standards.

   The maximum correction is ±1.0mm.

   $X \leq \pm 1.0$ mm
6) Push ”FPM” SW.

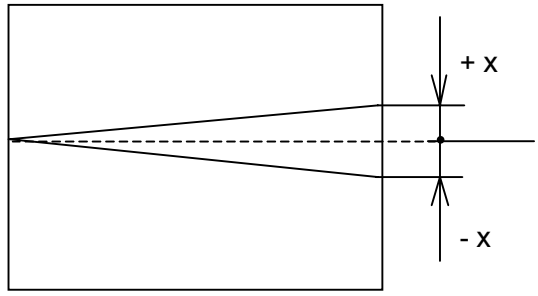

Fig. 3-2 Picture Tilt

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3-3. Side Pincushion Balance Adjustment

1) Receive the following signals, All White.

Signal 20 (1280*1024@85Hz)

2) Open Menu (S), Group 3)”PIN-BALANCE”.

Adjust "+", "-" SW so that the difference of XSL and XSR is equal (maximum 1.0 mm).

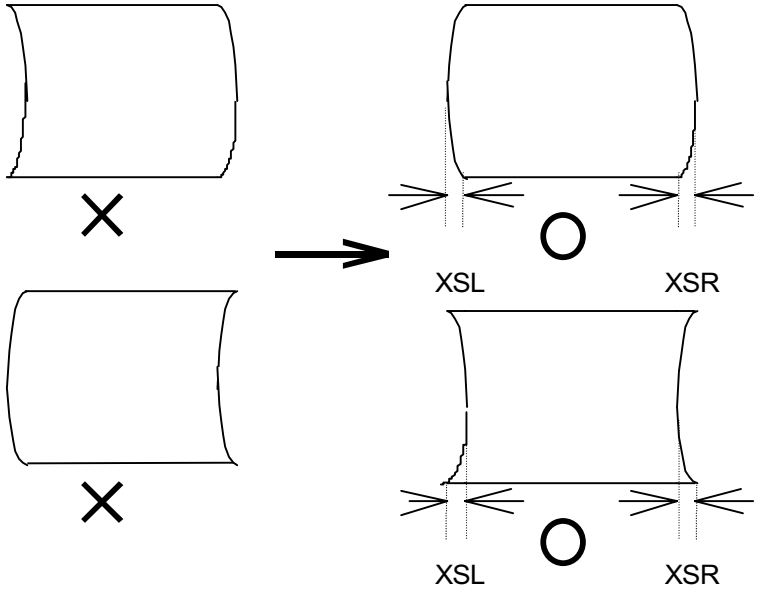

Fig. 3-3 Side Pincushion Balance

3-4. Side Pincushion Adjustment

1) Receive the following signals, All White.

Signal 11 (800*600@85Hz)

Signal 20 (1280*1024@85Hz)

2) Open Menu (S), Group 3)”PINCUSHION”.

Adjust "+", "-" SW so that the side pincushion distortion is small (maximum ± 0.5 mm).

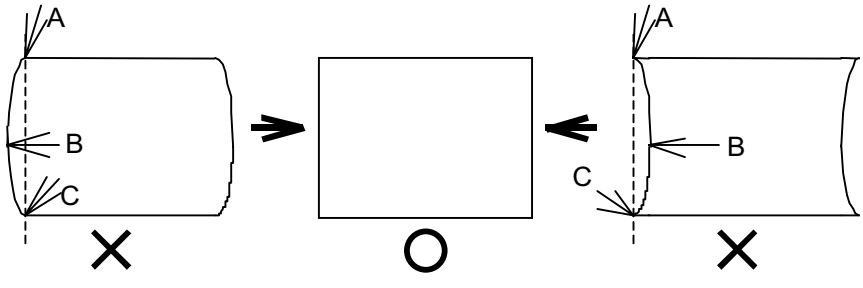

Fig. 3-4 Side Pincushion

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3-5. Trapezoid distortion Adjustment

1) Receive the following signals, All White.

Signal 11 (800*600@85Hz)

Signal 20 (1280*1024@85Hz)

2) Open Menu (S), Group 3) ”KEYSTONE”.

Adjust "+", "-" SW so that the Trapezoid Distortion is equal to X**top** and X**btm**.

(| X**top** – X**btm** | ≤ 1.0 mm)

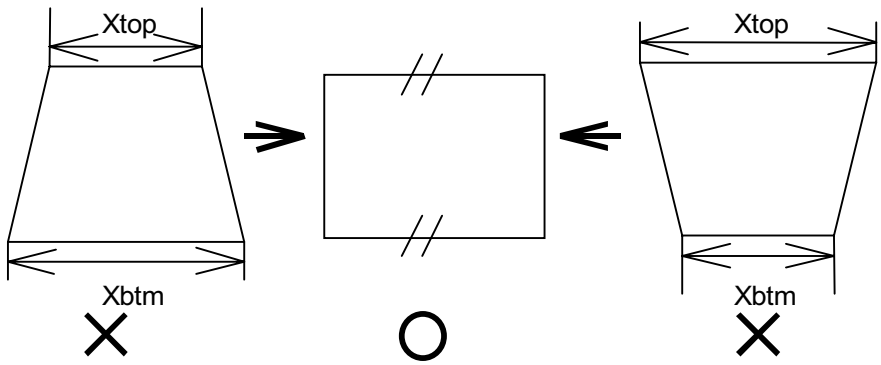

Fig. 3-5 Trapezoid Distortion

3-6. Parallelogram Distortion Adjustment

1) Receive the following signals, Crosshatch Pattern.

Signal 20 (1280*1024@85Hz)

2) Open Menu (S), Group 3) ”KEY-BALANCE”. Adjust "+", "-" SW so that the vertical line and horizontal line at the screen's center fall at right angles. (maximum 90° ± 0.5°)

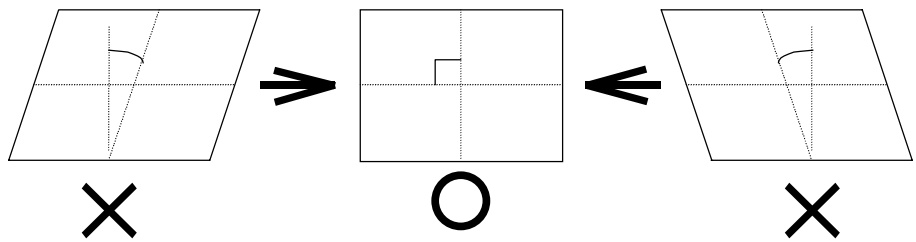

Fig. 3-6 Parallelogram Distortion

If Trapezoid Distortion is out of specification, repeat adjustment step 5-3.

It implements this adjustment in case of the following Undulation distortion.

Undulation is a directional difference of tilt at AB and DE.

Following figures (I) and (II) are example.

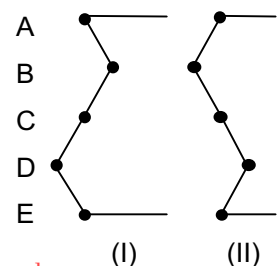

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Fig. 3-7 Vertical S-wave Distortion Definition

3-7. Corner Distortion Adjustment

Signal 11 (800*600@85Hz)

Signal 20 (1280*1024@85Hz)

Do this integrate when distortion is adjust in the top or the bottom after the integrate to 3-6 sections.

3-7-1. Top Corner Distortion Adjustment

1) Open Menu (S), Group 3) “TOP-PIN”. Adjust "+", "-" SW so that the top corner forms a right angle. (maximum ±1.0 mm)

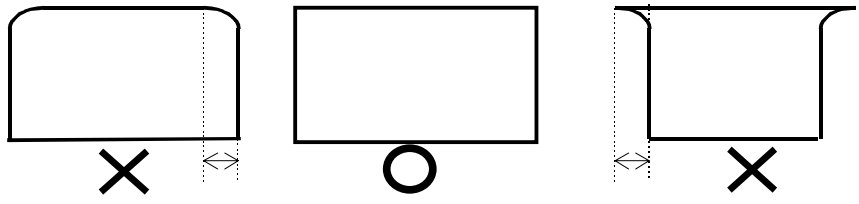

Fig. 3-8 Top Corner Distortion

3-7-2. Bottom Corner Distortion Adjustment

1) Open Menu(S), Group 3) “BOTTOM-PIN”. Adjust "+", "-" SW so that the bottom corner forms a right angle. (maximum ±1.0 mm)

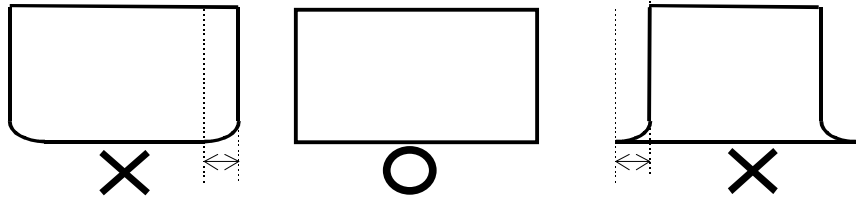

Fig. 3-9 Bottom Corner Distortion

3-7-3. Top Corner Balance Adjustment

1) Open Menu(S), Group 8) “TOP-PIN-BAL”. Adjust "+", "-" SW so that the top corner forms a right angle. (maximum ±1.0 mm)

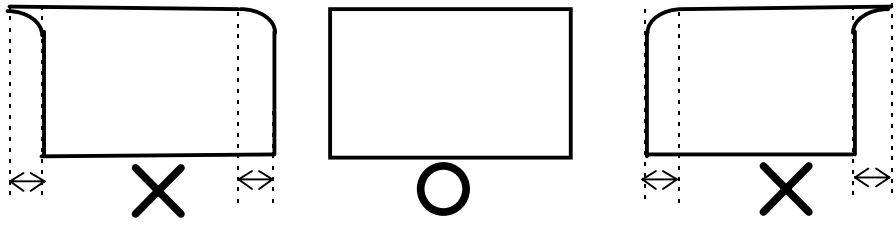

Fig. 3-10 Top Corner Balance

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3-7-4. Bottom Corner Balance Adjustment

1) Open Menu(S), Group 8) “BOTTOM-PIN-BAL”. Adjust "+", "-" SW so that the bottom corner forms a right angle. (maximum ±1.0 mm)

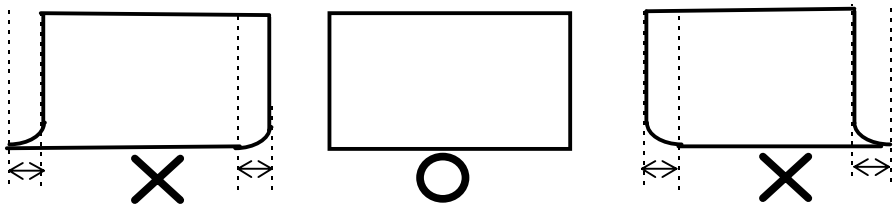

Fig. 3-11 Bottom Corner Balance

3-8. Overall Distortion Adjustment

Signal 11 (800*600@85Hz) All White

Signal 20 (1280*1024@85Hz) All White

1) Confirm that adjustment on steps 3-2 to 3-7 meets the specifications.

2) If undulating, re-adjustment each distortion adjustment.

Undulation is a directional difference of tilt at either AC and CE or both.

Following figures (I) and (II) are example. AB and BC, CD and DE are the direction of tilt. Undulated correction is the same direction of tilt at AB and BC, CD and DE.

Following figures (III) and (IV) are example. In this state, each adjustment standard must be met.

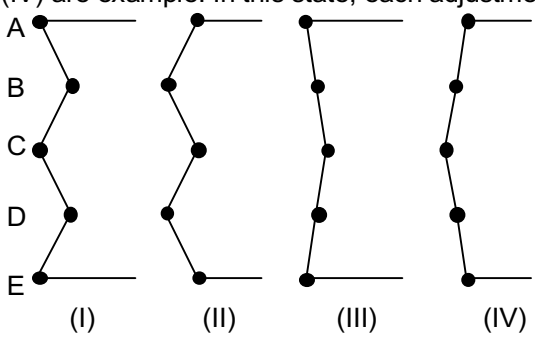

Fig. 3-12 Undulated Definition

3) For another signals, distortion data are calculated from above the adjustment value and the data are written into EEPROM.

4. Preset Picture Size and Position Adjustment

Signal :11 (800*600@85Hz) 20 (1280*1024@85Hz)

(Refer to Table 4)

Video : All White

1) Receive signal 11 (800*600@85Hz).

2) Open Menu (S), Group 2) “HORIZ-PHASE”,”VERT-POSITION”,” HORIZ-SIZE” and ”VERT-SIZE”.

3) Adjust the picture size and position as listed below by "+", "-" SW.

Picture Size H : 315 ± 2.0 mm

V : 236 ± 2.0 mm

Picture Position H : | XLeft – XRight | ≤ 1.0 mm

V : | XTop – XBottom | ≤ 1.0 mm

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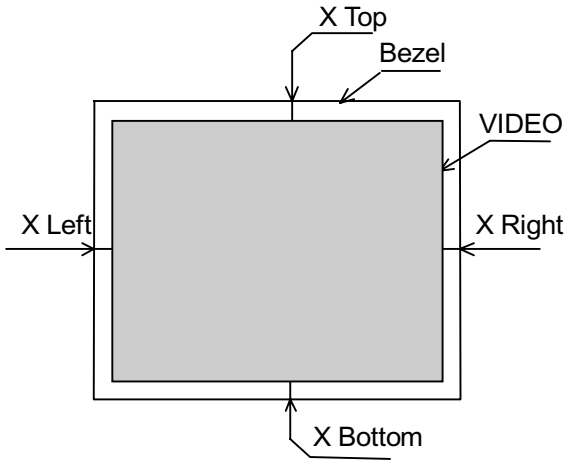


Fig. 4-1 Picture Position

4) For the signals below, picture size and position are calculated from above the adjustment data and the data are written into EEPROM.

Specification :

For user signals

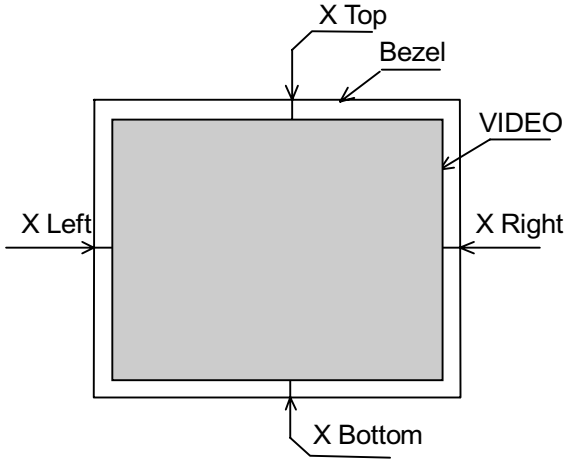
The picture must be in Bezel.

Picture Size H: 305 ± 20 mm

V: 224 ± 20 mm

Picture Position H: | XLeft – XRight | ≤ 20 mm

V : | XTop – XBottom | ≤ 20 mm



*Adjust all of signal listed below.

*If the picture size does not reach to bezel, input “MAX” data.

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Table 4)

In Distortion adjustment and Size/Position adjustment, Make memorize adjust data to EEPROM, as follows.

Preset Signal :

Signal No.11 / 20 : Write adjust data that is defined in actual adjustment.

Other preset signal : Write adjust data either that is defined in actual adjustment or that is calculated with result of signal 11 / 20 adjustment data.

User Signal (Ref. 1-11 / 1-6) : Write adjust data either that is defined in actual adjustment or that is calculated with result of signal 11 / 20 adjustment data.

Reference signal : Write suitable fixed data or caliculated with result of signal 11 / 20 adjustment data.

Table 4-1)

Preset Signal :

11	(VESA 800*600@85Hz)	20	(VESA1280*1024@85Hz)
3	(VGA480)	7	(VESA 640*480@75Hz)
8	(VESA 800*600@75Hz)	13	(VESA 1024*768@75Hz)
15	(VESA 1024*768@85Hz)	17	(VESA 1280*1024@75Hz)
19	(VESA 1600*1200@75Hz)		

User Signal :

1	(VGA350)	2	(VGA400)
4	(MAC 640*480)	5	(VESA 350@85Hz)
6	(VESA 400@85Hz)	9	(VESA 640*480@85Hz)
10	(MAC 832*624)	12	(VESA 1024*768@70Hz)
14	(MAC 1152*870)	16	(VESA 1280*1024@70Hz)
18	(VESA 1600*1200@65Hz)		

Reference signal :

105	(XGA(8514A))	103	(VESA 800*600@60Hz)
107	(1024*768@60Hz)	126	(XGA2 1024*768)
127	(MAC (1024*768))	114	(VESA 1280*1024@60Hz)
116	(VESA 1600*1200@60Hz)	128	(MAC 1280*960)
121	(VESA 1600*1200@70Hz)		

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5.Video Amplitude Adjustment

Signal 20 (1280*1024@85Hz), All Black

Signal 23 (1280*1024@85Hz(Window))

5-1. Settings

NOTE:

*Before adjustment, confirm that the video signal of generator is as follows.

Video : Analog 0.7Vp-p ± 0.01V p-p (terminated 75 ohms ± 1 %)

*Perform "5. Video Amplitude Adjustment", After "4.Preset Picture Size and Position Adjustment"

*Degauss the monitor using an external degaussing coil.(See II -4)

*Open Menu(S) Group7) and make sure that the following values.

CONTRAST	: ffh
BRIGHT MAX H	: 0dh
BRIGHT MAX L	: 4dh
BRIGHT CENTER H	: 0ah
BRIGHT CENTER L	: 00h
BRIGHTNESS	: 80h (50%)
R-BIAS-H (9300K)	: 80h
G-BIAS-H (9300K)	: 80h
B-BIAS-H (9300K)	: 80h
R-BIAS-M (6500K)	: 80h
G-BIAS-M (6500K)	: 80h
B-BIAS-M (6500K)	: 80h
R-BIAS-L (5000K)	: 80h
G-BIAS-L (5000K)	: 80h
B-BIAS-L (5000K)	: 80h
R-GAIN-H (9300K)	: 36h
G-GAIN-H (9300K)	: 36h
B-GAIN-H (9300K)	: 36h
R-GAIN-M (6500K)	: 36h
G-GAIN-M (6500K)	: 36h
B-GAIN-M (6500K)	: 26h
R-GAIN-L (5000K)	: 56h
G-GAIN-L (5000K)	: 36h
B-GAIN-L (5000K)	: 16h

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5-2. Cut Off Adjustment

1) Receive the following signal, All Black.

Signal 20 (1280*1024@85Hz) Frame Pattern

2) Connect the DVM with a high voltage probe to TP-SC on the CRT PWB and adjust SCREEN VR to the following value.

700 ± 5 Vdc

(Use a high voltmeter whose maximum voltage is more than 1.5kV and input resistance is more than 1000 MΩ.)

(Use color analyzer CA-100 or compatible.)

3) Bright center rough adjustment.

Open Menu (S), Group 7) "BRIGHT-CENT "and adjust "Y" by "+", "-" button so that its color analyzer indicated value is the following.

BRIGHT-CENT : 0.25~0.65 cd/m^2

If the value of "BRIGHT-CENT" reaches "BRIGHT-MAX reference value", it makes the adjustment of "BRIGHT-MAX" the following value.

BRIGHT-MAX : 3.00 ± 0.2 cd/m^2

And make the adjustment of "BRIGHT-CENT" again.

4) Open Menu (S), Group 7) "R-BIAS-H","B-BIAS-H" and adjust "x, y" by "+", "-" button so that its color analyzer indicated value is the following.

x = 0.283 ± 0.015, y = 0.297 ± 0.015 (color temperature : 9300K)

5) Open Menu (S), Group 7) "R-BIAS-M","G-BIAS-M","B-BIAS-M" and set to the same value of "R-BIAS-H","G-BIAS-H","B-BIAS-H"

6) Open Menu (S), Group 7) "BRIGHT-CENT" and adjust "Y" by "+", "-" button so that its color analyzer indicated value is the following.

BRIGHT-CENT : 0.2~0.4cd/m^2

7) Open Menu (S), Group 7) "BRIGHT-MAX" and adjust "Y" by "+", "-" button so that its color analyzer indicated value is the following.

BRIGHT-MAX : 4.0 ± 0.5cd/ m^2

8) When the indicated value of "x, y" is over, repeat steps 4) to 7).

9) Open Menu (S) Group 7) "R-BIAS-M","B-BIAS-M" and adjust "x, y" by "+", "-" button so that its color analyzer indicated value is the following.

x = 0.313 ± 0.015, y = 0.329 ± 0.015 (color temperature : 6500K)

10) Open Menu (S), Group 7) "R-BIAS-L","G-BIAS-L","B-BIAS-L" and set to the same value of "R-BIAS-H","G-BIAS-H","B-BIAS-H".

11) Open Menu (S), Group 7) "R-BIAS-L","B-BIAS-L" and adjust "x, y" by "+", "-" button so that its color analyzer indicated value is the following.

x = 0.345 ± 0.015, y = 0.359 ± 0.015 (color temperature : 5000K)

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5-3 Color Preset Adjustment

(A) GAIN-H Adjustment (9300K)

1) Receive the following signal. And it makes the "GREEN WINDOW" output of the signal generator.

Signal 23 (1280*1024@85Hz(Window))

2) Open Menu (S), Group 7) "G-GAIN-H" and adjust "Y" by "+", "-" button so that its color analyzer indicated value is the following.

G-GN1 : 100 ± 3 cd/m^2

3) Receive the following signal. And it makes the "WHITE WINDOW" output of the signal generator.

Signal 23 (1280*1024@85Hz(Window))

4) Open Menu (S), Group 7) "R-GAIN-H","B-GAIN-H","G-GAIN-H" and adjust "x, y," by "+", "-" button so that its color analyzer indicated value is the following.

x = 0.283 ± 0.010, y = 0.297 ± 0.010, Y=145 ± 10 cd/m^2 (color temperature : 9300K)

(B) GAIN-MAX Adjustment

1) Open Menu (S), Group 7) "R-GAIN-MAX","G-GAIN-MAX","B-GAIN-MAX" .

2) Select the MAX. value from "R-GAIN-H","G-GAIN-H","B-GAIN-H" and set to the MAX. value into "R-GAIN-MAX","G-GAIN-MAX","B-GAIN-MAX".

(C) GAIN-M Adjustment (6500K)

1) Open Menu (S), Group 7) "R-GAIN-M","G-GAIN-M","B-GAIN-M"" and set to the same value of "R-GAIN-H","G-GAIN-H","B-GAIN-H".

2) Receive the following signal. And it makes the "WHITE WINDOW" output of the signal generator.

Signal 23 (1280*1024@85Hz(Window))

3) Open Menu (S), Group 7) "G-GAIN-M","B-GAIN-M" and adjust "x, y," by "+", "-" button so that its color analyzer indicated value is the following.

x = 0.313 ± 0.010, y = 0.329 ± 0.010,

(Luminance Y=130 ± 10 cd/m^2 (color temperature : 6500K):Reference value for Adjustment.)

Note : Do not change "R-GAIN-M" that adjusted the color preset in (C)-1).

(D) GAIN-L Adjustment (5000K)

1) Open Menu (S), Group 7) "R-GAIN-L","G-GAIN-L","B-GAIN-L" and set to the same value of "R-GAIN-H","G-GAIN-H","B-GAIN-H".

2) Receive the following signal. And it makes the "WHITE WINDOW" output of the signal generator.

Signal 23 (1280*1024@85Hz(Window))

3) Open Menu (S), Group 7) "G-GAIN-L","B-GAIN-L "and adjust "x, y," by "+", "-" button so that its color analyzer indicated value is the following.

x = 0.345 ± 0.010, y = 0.359 ± 0.010,

(Luminance Y=113 ± 10 cd/m^2 (color temperature : 5000K):Reference value for Adjustment.)

Note : Do not change "R-GAIN-L" that adjusted the color preset in (D)-1).

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5-4 ABL Adjustment

BRIGHTNESS CENTER: 80h(50%)

1) Make sure that the value of "CONTRAST" becomes MAX.
2) Receive the following signal. And it makes the "ALL WHITE" output of the signal generator.

   Signal 20 (1280*1024@85Hz)

3) Open Menu (S), Group 7) "ABL" and adjust "Y" by "+", "-" button so that its color analyzer indicated value is the following.

   ABLAJ : 110 ± 5 cd/m^2

5-5 sRGB Adjustment (Auto adjustment only)

CONTRAST MAX.

BRIGHTNESS CENTER : 80h(50%)

1) Receive the following signal.

   Signal 23 (1280*1024@85Hz(Window))

2) Select the following "ADDR"

   ADDR : 0x010e (CONT_OFFSET)

3) Adjust the following value on the color analyzer.

   Luminance Y = 85 ± 5 cd/m^2 (color temperature : 6500K)

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6. Focus Adjustment

Signal 20 (1280*1024@85Hz) “∃”character

PC Excel Focus Inspection Pattern “1280x1024@85”

*1 : PC Excel Focus Inspection Pattern

Video Card : Millennium ll (matrox)

Application : Excel (Microsoft)

Font : Arial

Font Size : 8

Character : ##&&%%$$##

Set the OSM to the following.

BRIGHT : Preset.

CONTRAST : Max.

*Perform this focus adjustment, after maximum horizontal amplitude adjustment, maximum vertical amplitude adjustment and video adjustment are completed.

6-1.Focus VR adjustment

1) Receive Excel of PC (Focus check pattern) by the following resolution.

1280*1024@85Hz

2) Open Menu (S), Group 8) "VFOCS" and adjust the value is the following by "+", "-" button.

VFOCS 40

3) Open Menu (U), Group 2) and adjust “HORIZ-POSITION”, “VERT-POSITION”, “HORIZ-SIZE” and “VERT-SIZE” and adjust the picture size and position as listed below by "+", "-" SW.

Picture Size H : 315 ± 3.0 mm

V : 236 ± 3.0 mm

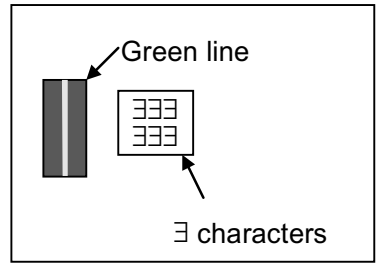
Picture Position H : $| XLeft - XRight | \leq 3.0$ mm

V : $| XTop - XBottom | \leq 3.0$ mm

4) Adjust VR F1 of FBT (Upper side VR) for the left side Green vertical line to become fine.(Fig.6-1)

5) Adjust VR F2 of FBT (Lower side VR) for the [∃] characters located on left side to become fine.(Fig.6-1)

Make sure that the horizontal line of EXCEL not become double line and characters are fine on all area.



Excel of PC

Fig. 6-1

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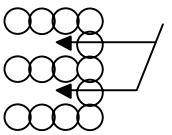
6) Receive the following signal, “∃” character.

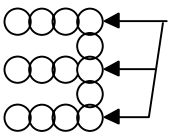
Signal 20 (1280*1024@85Hz)

7) Open MENU (U), Group 2) “SIZE & POSITION” and adjust picture size to MAX in bezel.

8) Make sure that the horizontal lines of “∃” character are crisp as possible in the Whole screen by the following color. Green and White

a) 

The space between horizontal lines is crisp.

b) 

The horizontal lines are not bold, and do not form halo.

9) When “∃”character do not confirm specification, adjust again 4), 5).

*In case the set can not adjust as specifications, perform V-FOCUS adjustment.(6-2)

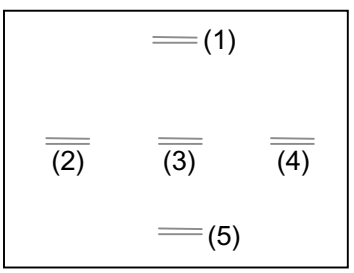
6-2.V-FOCUS adjustment

1) Receive Excel of PC (Focus check pattern) by the following resolution.

1280*1024@85

2) Open (Menu (S), Group 8) "VFOCS")

Compare (5) with (3), in case (3) is wider than (5), increase the counter of “VFOCS” in case (3) is narrower than (5), decrease the counter of "VFOCS".



(1).The line is located fourth line from the top.

(2).The line is located fourth cell from the left.

(3).The line is located center.

(4).The line is located fourth cell from the right.

(5).The line is located fourth line from the bottom.

Fig. 6-2 Excel of PC (Focus check pattern)

3) After Focus OSM counter adjustment, adjust again 6-1 4), 5).

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7. Convergence Adjustment

Signal 15 (1024*768@85Hz) Cross Hatch Pattern

*Adjustment Magnetic Field by three dimension magnetic field system.

*Set a Convergence Meter: S.P.(SPRIT PITCH): 0.25mm

*Open Menu (S), TAG 5) and make sure that the following values.

HORIZ-CONVERGENCE : 80h(50%)

VERT-CONVERGENCE : 80h(50%)

1) Receive the following signal, Cross Hatch Pattern and set the H / V interval of Cross Hatch Pattern to the following.

15 (1024*768@85Hz)

H interval : 62 dots V interval: 61 dots

2) Open Menu (S), Group 2) and adjust screen size and position as the following.

Picture Size H : 315 ± 3.0 mm

V : 236 ± 3.0 mm

Picture Position H : | XLeft – XRight | ≤ 3.0 mm

V : | XTop – XBottom | ≤ 3.0 mm

3) Measure convergence and make sure the following specification.

B ver. |x| ≤ 0.33mm, |y| ≤ 0.33mm

If it dose not apply convergence spec, adjust convergence as the followings.

Note : There are limit OSM adjustment as the following.

Menu (S), Group 5)

HORIZ-CONVERGENCE : 40h(25%) ~ C0h(75%)

VERT-CONVERGENCE : 40h(25%) ~ C0h(75%)

While measuring convergence, hide OSM with “PROCEED” SW.

4) Measure convergence at screen picture.

If it is 0.21mm or greater, adjust 4-pole and 6-pole magnet on CPM to get 0.21mm or less.

5) Open Menu (S), Group 5) HORIZ-CONVERGENCE”, “VERT-CONVERGENCE” and adjust so that convergence of G,H,I point (Fig. 7-1) is the minimum.

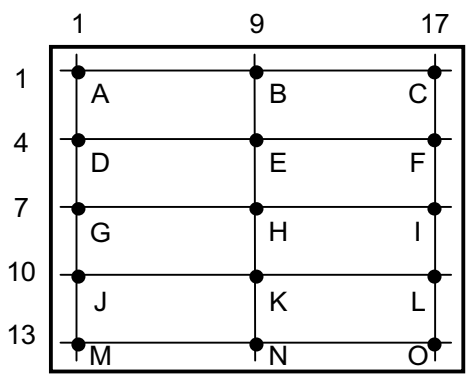

Fig. 7-1 convergence adjust point

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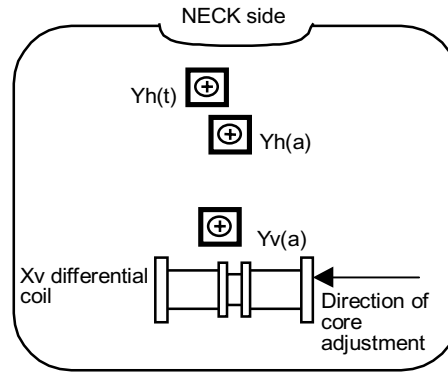
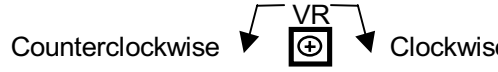
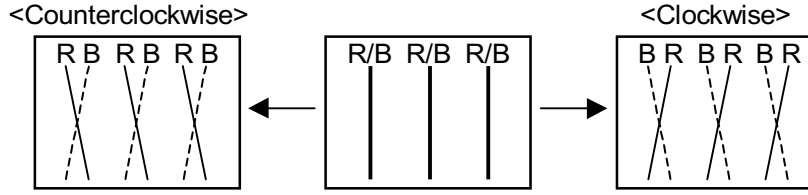
Operation of the NF41 U (M41LRY21X21) adjustment VR



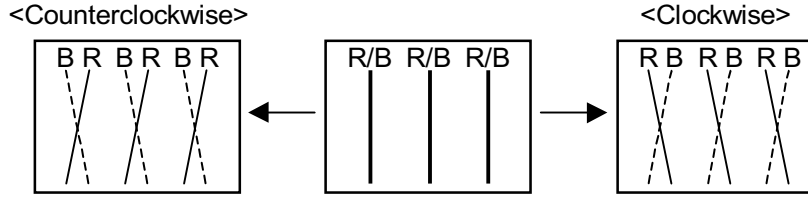
*As seen from the FACE side

Yh (tilt) - VR

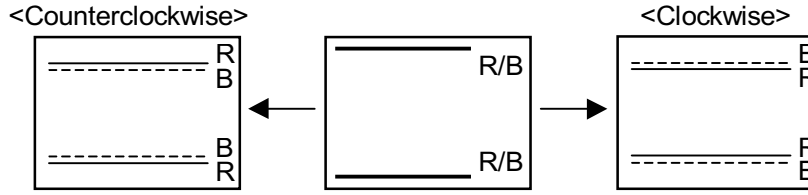




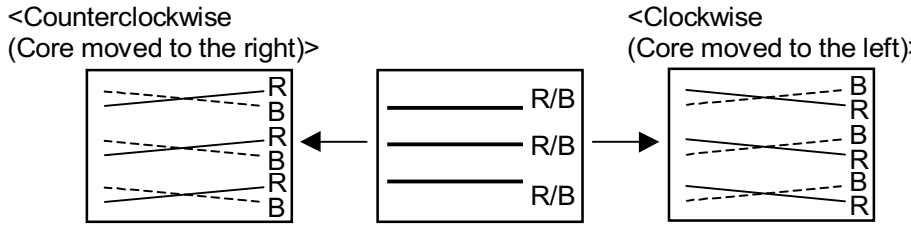
Yh (amp) - VR



Yv (amp) - VR



Xv correction differential coil



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[D] Reference

1. List of Signals

1-1. All signals

NO	Signal Name	Video Signal	SYNC POLARITY (H/V)
1	VGA 350	Video Signal 0.7V	H/V Separate P/N
2	VGA 400	Video Signal 0.7V	H/V Separate N/P
3	VGA 480	Video Signal 0.7V	H/V Separate N/N
4	MAC 640*480	Video Signal 0.7V	Composite Sync Signal N/N
5	VESA 350@85Hz	Video Signal 0.7V	H/V Separate P/N
6	VESA 400@85Hz	Video Signal 0.7V	H/V Separate N/P
7	VESA 640*480@75Hz	Video Signal 0.7V	H/V Separate N/N
8	VESA 800*600@75Hz	Video Signal 0.7V	H/V Separate P/P
9	VESA 640*480@85Hz	Video Signal 0.7V	H/V Separate N/N
10	MAC 832*624	Video Signal 0.7V	Composite Sync Signal N/N
11	VESA 800*600@85Hz	Video Signal 0.7V	H/V Separate P/P
12	VESA 1024*768@70Hz	Video Signal 0.7V	H/V Separate N/N
13	VESA 1024*768@75Hz	Video Signal 0.7V	H/V Separate P/P
14	MAC 1152*870	Video Signal 0.7V	Composite Sync Signal N/N
15	VESA 1024*768@85Hz	Video Signal 0.7V	H/V Separate P/P
16	VESA 1280*1024@70Hz	Video Signal 0.7V	Composite Sync Signal P/P
17	VESA 1280*1024@75Hz	Video Signal 0.7V	H/V Separate P/P
18	VESA 1600*1200@65Hz	Video Signal 0.7V	H/V Separate P/P
19	VESA 1600*1200@75Hz	Video Signal 0.7V	H/V Separate P/P
20	VESA 1280*1024@85Hz	Video Signal 0.7V	H/V Separate P/P
21	96.0KHz/160Hz A=68%	Video Signal 0.7V	H/V Separate P/P
22	V.RASTER	Video Signal 0.7V	H/V Separate P/P
23	1280*1024@85Hz(Window)	Video Signal 0.7V	H/V Separate P/P
24	EDID	Video Signal 0.7V	H/V Separate N/N
25	VGA480 (1/2)	Video Signal 0.7V	H/V Separate N/N
26	MAC1152*870(N/N+SOG)	Video Signal 0.7V	Composite Sync Signal N/N
27	1280*960@85Hz	Video Signal 0.7V	H/V Separate P/P

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NO	Signal Name	Video Signal	SYNC POLARITY (H/V)
101	PC98 640*400@70Hz R	Video Signal 0.7V	H/V Separate P/P
102	VESA 800*600@56Hz	Video Signal 0.7V	H/V Separate P/P
103	VESA 800*600@60Hz	Video Signal 0.7V	H/V Separate P/P
104	VESA 640*480@75Hz R	Video Signal 0.7V	H/V Separate P/P
105	XGA(8514A)	Video Signal 0.7V	H/V Separate P/P
106	1024*768@56Hz	Video Signal 0.7V	H/V Separate N/N
107	1024*768@60Hz	Video Signal 0.7V	H/V Separate N/N
108	GTF640*480@100 (N/N)	Video Signal 0.7V	H/V Separate N/N
109	800*600@80Hz	Video Signal 0.7V	H/V Separate P/P
110	640*480@100Hz	Video Signal 0.7V	H/V Separate N/N
111	1024*768@70Hz	Video Signal 0.7V	H/V Separate N/N
112	1024*768@72Hz	Video Signal 0.7V	H/V Separate P/P
113	GTF640*480@120Hz (N/N)	Video Signal 0.7V	H/V Separate N/N
114	VESA1280*1024@60Hz	Video Signal 0.7V	H/V Separate P/P
115	640*480@120Hz	Video Signal 0.7V	H/V Separate N/N
116	VESA 1600*1200@60Hz	Video Signal 0.7V	H/V Separate P/P
117	800*600@120Hz	Video Signal 0.7V	H/V Separate N/N
118	VESA 1792*1344@60Hz (N/N)	Video Signal 0.7V	H/V Separate N/N
119	1280*960@85Hz	Video Signal 0.7V	H/V Separate P/P
120	640*480@160Hz	Video Signal 0.7V	H/V Separate N/N
121	VESA 1600*1200@70Hz	Video Signal 0.7V	H/V Separate P/P
122	VESA 1920*1440@60Hz (N/N)	Video Signal 0.7V	H/V Separate N/N
123	1024*768@120Hz	Video Signal 0.7V	H/V Separate P/P
124	VESA 1792*1344@75Hz (N/N)	Video Signal 0.7V	H/V Separate N/N
125	1280*1024@100Hz	Video Signal 0.7V	H/V Separate P/P
126	XGA2 1024*768	Video Signal 0.7V	
127	MAC 1024*768	Video Signal 0.7V	
128	MAC 1280*960	Video Signal 0.7V	

*The crosshatch pattern shall have 17 vertical lines and 13 horizontal lines.

*In case set receive the Signal that H sync polarity is ”Neg.” and V sync polarity is “Posi.” , “SIZE” and “POSITION” change from preset size.

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1-2. Preset / user signal number

	No.	Signal Name	Signal No.
Preset	1	VGA 480	3
	2	VESA 640*480@75Hz	7
	3	VESA 800*600@75Hz	8
	4	VESA 800*600@85Hz	11
	5	VESA 1024*768@75Hz	13
	6	VESA 1024*768@85Hz	15
	7	VESA 1280*1024@75Hz	17
	8	VESA 1280*1024@85Hz	20
	9	VESA 1600*1200@75Hz	19
User (Ref.1 – 11)	1	VGA 350	1
	2	VGA 400	2
	3	MAC 640*480	4
	4	VESA 350@85Hz	5
	5	VESA 400@85Hz	6
	6	VESA 640*480@85Hz	9
	7	MAC 832*624	10
	8	VESA 1024*768@70Hz	12
	9	MAC 1152*870	14
	10	VESA 1280*1024@70Hz	16
	11	VESA 1600*1200@65Hz	18
Ref (12 – 20)	12	XGA(8514A)	105
	13	VESA 800*600@60Hz	103
	14	1024*768@60Hz	107
	15	XGA2 1024*768	126
	16	MAC (1024*768)	127
	17	VESA1280*1024@60Hz	114
	18	VESA 1600*1200@60Hz	116
	19	MAC 1280*960	128
	20	VESA 1600*1200@70Hz	121

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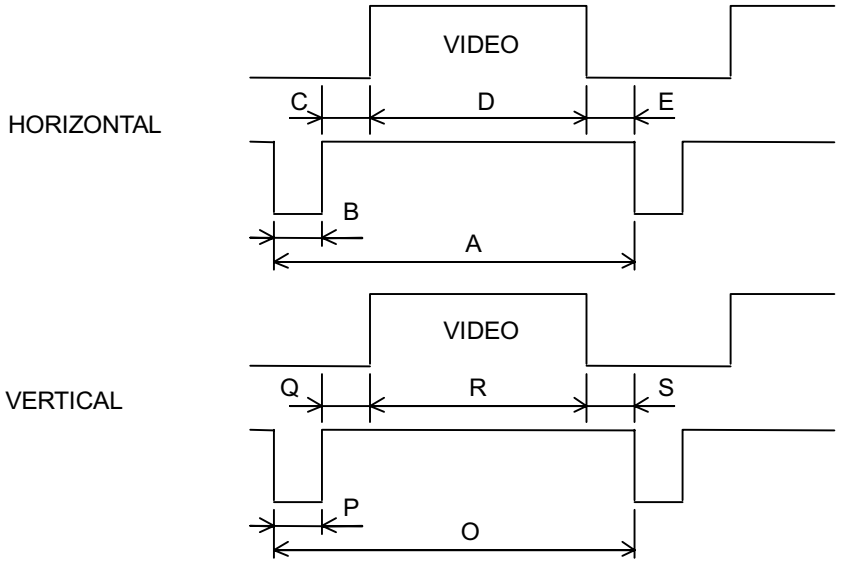
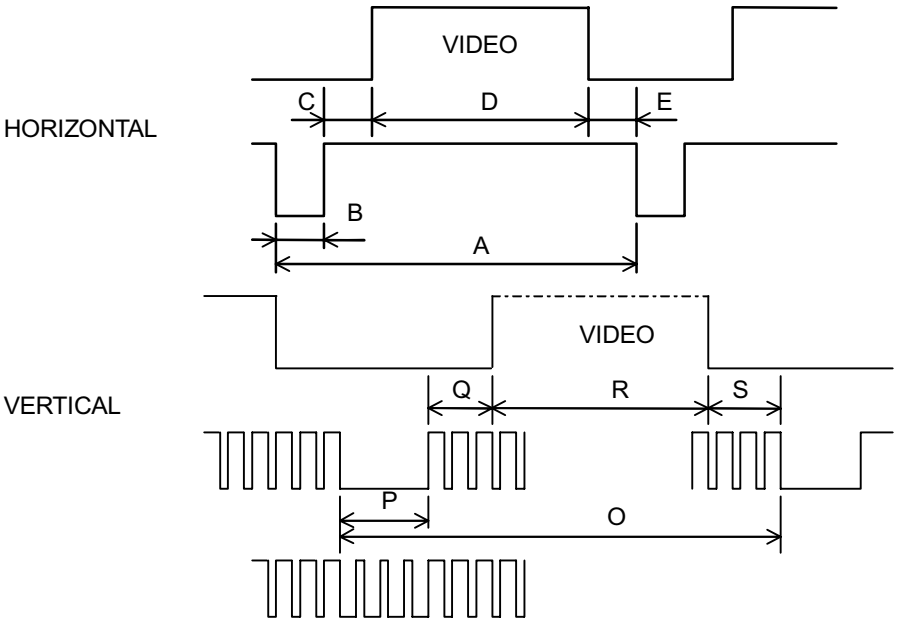
2. Signal Timing Charts

SEPARATE SYNC



Sync Polarity : Positive/Negative

COMPOSITE SYNC



Sync Polarity : Positive/Negative

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Adjustment / Inspection Signal (1)

	PROGRAM No.		1	2	3	4
	SIGNAL NAME		VGA350	VGA400	VGA480	MAC 640*480
	RESOLUTION		720*350	720*400	640*480	640*480
	DOT CLOCK	(MHz)	28.322	28.322	25.175	30.24
	fh	(kHz)	31.47	31.47	31.47	35.00
	fv	(Hz)	70.09	70.09	59.94	66.67
H	CELL SIZE	(DOT)	9	9	8	8
	TOTAL	(DOT)	900	900	800	864
		(CHR)	100	100	100	108
		(us)	31.78	31.78	31.78	28.57
	DISP	(DOT)	720	720	640	640
		(CHR)	80	80	80	80
		(us)	25.42	25.42	25.42	21.16
	FRONT	(DOT)	18	18	16	64
		(us)	0.64	0.64	0.64	2.12
	SYNC PULSE	(DOT)	108	108	96	64
		(us)	3.81	3.81	3.81	2.12
	BACK	(DOT)	54	54	48	96
		(us)	1.91	1.91	1.91	3.17
V	CELL SIZE	(H)	14	16	16	16
	TOTAL	(H)	449	449	525	525
		(ms)	14.268	14.268	16.683	15.000
	DISP	(H)	350	400	480	480
		(CHR)	25	25	30	30
		(ms)	11.122	12.711	15.253	13.714
	FRONT	(H)	37	12	10	3
		(ms)	1.176	0.381	0.318	0.086
	SYNC PULSE	(H)	2	2	2	3
		(ms)	0.064	0.064	0.064	0.086
	BACK	(H)	60	35	33	39
		(ms)	1.907	1.112	1.049	1.114
	INTERLACE		NON	NON	NON	NON
	POLARITY	(H/V)	POS/NEG	NEG/POS	NEG/NEG	NEG/NEG
	COMPOSITE SYNC		-	-	-	YES
	COMPOSITE VIDEO		-	-	-	-
	CHARACTER FONT		7*9	7*9	7*9	7*9
	SERRATION		OFF	OFF	OFF	ON
	EQP		OFF	OFF	OFF	OFF

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Adjustment / Inspection Signal (2)

	PROGRAM No.		5	6	7	8
	SIGNAL NAME		VESA 350 @85Hz	VESA 400 @85Hz	VESA 640*480 @75Hz	VESA 800*600 @75Hz
	RESOLUTION		640*350	640*400	640*480	800*600
	DOT CLOCK	(MHz)	31.5	31.500	31.5	49.5
	fh	(kHz)	37.86	37.861	37.5	46.875
	fv	(Hz)	85.08	85.080	75.00	75.00
H	CELL SIZE	(DOT)	8	8	8	8
	TOTAL	(DOT)	832	832	840	1056
		(CHR)	104	104	105	132
		(us)	26.413	26.413	26.67	21.33
	DISP	(DOT)	640	640	640	800
		(CHR)	80	80	80	100
		(us)	20.32	20.317	20.32	16.162
	FRONT	(DOT)	32	32	16	16
		(us)	1.016	1.016	0.51	0.323
	SYNC PULSE	(DOT)	64	64	64	80
		(us)	2.032	2.032	2.03	1.616
	BACK	(DOT)	96	96	120	160
		(us)	3.048	3.048	3.81	3.232
V	CELL SIZE	(H)	14	16	16	15
	TOTAL	(H)	445	445	500	625
		(ms)	11.754	11.754	13.333	13.333
	DISP	(H)	350	400	480	600
		(CHR)	25	25	30	40
		(ms)	9.244	10.565	12.800	12.800
	FRONT	(H)	32	1	1	1
		(ms)	0.845	0.026	0.027	0.021
	SYNC PULSE	(H)	3	3	3	3
		(ms)	0.079	0.079	0.080	0.064
	BACK	(H)	60	41	16	21
		(ms)	1.585	1.083	0.427	0.448
	INTERLACE		NON	NON	NON	NON
	POLARITY	(H/V)	POS/NEG	NEG/POS	NEG/NEG	POS/POS
	COMPOSITE SYNC		-	-	-	-
	COMPOSITE VIDEO		-	-	-	-
	CHARACTER FONT		7*9	7*9	7*9	7*9
	SERRATION		OFF	OFF	OFF	OFF
	EQP		OFF	OFF	OFF	OFF

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Adjustment / Inspection Signal (3)

	PROGRAM No.		9	10	11	12
	SIGNAL NAME		VESA 640*480 @85Hz	MAC 832*624	VESA 800*600 @85Hz	VESA 1024*768 @70Hz
	RESOLUTION		640*480	832*624	800*600	1024*768
	DOT CLOCK	(MHz)	36	57.283	56.25	75.00
	fh	(kHz)	43.27	49.72	53.67	56.476
	fv	(Hz)	85.01	74.55	85	70.069
H	CELL SIZE	(DOT)	8	8	8	8
	TOTAL	(DOT)	832	1152	1048	1328
		(CHR)	104	144	131	166
		(us)	23.11	20.11	18.63	17.707
	DISP	(DOT)	640	832	800	1024
		(CHR)	80	104	100	128
		(us)	17.78	14.52	14.22	13.653
	FRONT	(DOT)	56	32	32	24
		(us)	1.56	0.56	0.57	0.32
	SYNC PULSE	(DOT)	56	64	64	136
		(us)	1.56	1.12	1.14	1.813
	BACK	(DOT)	80	224	152	144
		(us)	2.22	3.91	2.70	1.92
V	CELL SIZE	(H)	16	16	15	16
	TOTAL	(H)	509	667	631	806
		(ms)	11.764	13.414	11.756	14.272
	DISP	(H)	480	624	600	768
		(CHR)	30	39	40	48
		(ms)	11.093	12.549	11.179	13.599
	FRONT	(H)	1	1	1	3
		(ms)	0.023	0.020	0.019	0.053
	SYNC PULSE	(H)	3	3	3	6
		(ms)	0.069	0.060	0.056	0.106
	BACK	(H)	25	39	27	29
		(ms)	0.578	0.784	0.503	0.513
	INTERLACE		NON	NON	NON	NON
	POLARITY	(H/V)	NEG/NEG	NEG/NEG	POS/POS	NEG/NEG
	COMPOSITE SYNC		-	Yes	-	-
	COMPOSITE VIDEO		-	-	-	-
	CHARACTER FONT		7*9	7*9	7*9	7*9
	SERRATION		OFF	ON	OFF	OFF
	EQP		OFF	OFF	OFF	OFF

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Adjustment / Inspection Signal (4)

	PROGRAM No.		13	14	15	16
	SIGNAL NAME		VESA 1024*768 @75Hz	MAC 1152*870	VESA 1024*768 @85Hz	VESA 1280*1024 @70Hz
	RESOLUTION		1024*768	1152*870	1024*768	1280*1024
	DOT CLOCK	(MHz)	78.75	100	94.5	127
	fh	(kHz)	60.02	68.681	68.68	74.97
	fv	(Hz)	75.03	75.062	85.00	69.87
H	CELL SIZE	(DOT)	8	8	8	8
	TOTAL	(DOT)	1312	1456	1376	1694
		(CHR)	164	182	172	212
		(us)	16.66	14.560	14.560	13.339
	DISP	(DOT)	1024	1152	1024	1280
		(CHR)	128	144	128	160
		(us)	13.00	11.52	10.836	10.097
	FRONT	(DOT)	16	32	48	30
		(us)	0.203	0.320	0.508	0.236
	SYNC PULSE	(DOT)	96	128	96	160
		(us)	1.219	1.280	1.016	1.26
	BACK	(DOT)	176	144	208	224
		(us)	2.235	1.440	2.201	1.764
V	CELL SIZE	(H)	16	15	16	16
	TOTAL	(H)	800	915	808	1073
		(ms)	13.328	13.322	11.765	13.659
	DISP	(H)	768	870	768	1024
		(CHR)	48	58	48	
		(ms)	12.795	12.667	11.183	13.659
	FRONT	(H)	1	3	1	3
		(ms)	0.017	0.044	0.015	0.040
	SYNC PULSE	(H)	3	3	3	4
		(ms)	0.050	0.044	0.044	0.053
	BACK	(H)	28	39	36	42
		(ms)	0.466	0.568	0.524	0.56
	INTERLACE		NON	NON	NON	NON
	POLARITY	(H/V)	POS/POS	NEG/NEG	POS/POS	NEG/NEG
	COMPOSITE SYNC		-	Yes	-	Yes
	COMPOSITE VIDEO		-	-	-	-
	CHARACTER FONT		7*9	7*9	7*9	7*9
	SERRATION		OFF	ON	OFF	OFF
	EQP		OFF	OFF	OFF	OFF

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Adjustment / Inspection Signal (5)

	PROGRAM No.		17	18	19	20
	SIGNAL NAME		VESA 1280*1024 @75Hz	VESA 1600*1200 @65Hz	VESA 1600*1200 @75Hz	VESA 1280*1024 @85Hz
	RESOLUTION		1280*1024	1600*1200	1600*1200	1280*1024
	DOT CLOCK	(MHz)	135	175.5	202.5	157.5
	fh	(kHz)	79.976	81.25	93.75	91.146
	fv	(Hz)	75.025	65	75	85.024
H	CELL SIZE	(DOT)	8	8	8	8
	TOTAL	(DOT)	1688	2160	2160	1728
		(CHR)	211	270	270	216
		(us)	12.504	12.308	10.667	10.97
	DISP	(DOT)	1280	1600	1600	1280
		(CHR)	160	200	200	160
		(us)	9.481	9.117	7.901	8.13
	FRONT	(DOT)	16	64	64	64
		(us)	0.119	0.365	0.306	0.406
	SYNC PULSE	(DOT)	144	192	192	160
		(us)	1.067	1.094	0.948	1.016
	BACK	(DOT)	248	304	304	224
		(us)	1.837	1.732	1.501	1.42
V	CELL SIZE	(H)	16	16	16	16
	TOTAL	(H)	1066	1250	1250	1072
		(ms)	13.329	15.385	13.33	11.761
	DISP	(H)	1024	1200	1200	1024
		(CHR)	64	75	75	64
		(ms)	12.804	14.769	12.8	11.235
	FRONT	(H)	1	1	1	1
		(ms)	0.013	0.012	0.011	0.011
	SYNC PULSE	(H)	3	3	3	3
		(ms)	0.038	0.037	0.032	0.033
	BACK	(H)	38	46	46	44
		(ms)	0.475	0.566	0.491	0.483
	INTERLACE		NON	NON	NON	NON
	POLARITY	(H/V)	POS/POS	POS/POS	POS/POS	POS/POS
	COMPOSITE SYNC		-	-	-	-
	COMPOSITE VIDEO		-	-	-	-
	CHARACTER FONT		7*9	7*9	7*9	7*9
	SERRATION		OFF	OFF	OFF	OFF
	EQP		OFF	OFF	OFF	OFF

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Adjustment / Inspection Signal (6)

	PROGRAM No.		21	22	23	24
	SIGNAL NAME		96KHz 160Hz A=68%	V.RASTER	1280*1024 @85Hz (Window)	EDID
	RESOLUTION		680*446	1024*768	1280*1024	720*685
	DOT CLOCK	(MHz)	96	87.77	157.5	28.322
	fh	(kHz)	96	66.90	91.146	31.47
	fv	(Hz)	160	75.00	85.024	42.01
H	CELL SIZE	(DOT)	8	8	8	9
	TOTAL	(DOT)	1000	1312	1728	900
		(CHR)	125	164	216	100
		(us)	10.42	14.948	10.97	31.78
	DISP	(DOT)	680	1024	360	720
		(CHR)	85	128	45	80
		(us)	7.08	11.667	2.29	25.42
	FRONT	(DOT)	57	16	524	18
		(us)	0.59	0.182	3.32	0.64
	SYNC PULSE	(DOT)	160	96	160	108
		(us)	1.67	1.094	1.02	3.81
	BACK	(DOT)	103	176	684	54
		(us)	1.07	2.012	4.34	1.906
V	CELL SIZE	(H)	16	16	16	14
	TOTAL	(H)	600	892	1072	749
		(ms)	6.25	13.333	11.761	23.80
	DISP	(H)	446	768	352	685
		(CHR)	27.875	48	22	48.93
		(ms)	4.646	11.480	3.862	21.77
	FRONT	(H)	54	62	337	14
		(ms)	0.563	0.927	3.697	0.44
	SYNC PULSE	(H)	3	3	3	3
		(ms)	0.031	0.045	0.033	0.095
	BACK	(H)	97	59	380	47
		(ms)	1.010	0.882	4.169	1.494
	INTERLACE		NON	NON	NON	NON
	POLARITY	(H/V)	POS/POS	POS/POS	POS/POS	NEG/NEG
	COMPOSITE SYNC		-	-	-	-
	COMPOSITE VIDEO		-	-	-	-
	CHARACTER FONT		7*9	7*9	7*9	7*9
	SERRATION		OFF	OFF	OFF	OFF
	EQP		OFF	OFF	OFF	OFF

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Adjustment / Inspection Signal (7)

	PROGRAM No.		25	26	27	
	SIGNAL NAME		VGA480 (1/2)	MAC 1152*870 (N/N+SOG)	1280*960 @85Hz	
	RESOLUTION		640*240	1152*870	1280*1024	
	DOT CLOCK	(MHz)	25.175	100	157.5	
	fh	(kHz)	31.47	68.681	91.146	
	fv	(Hz)	59.94	75.062	85.024	
H	CELL SIZE	(DOT)	8	8	8	
	TOTAL	(DOT)	800	1456	1728	
		(CHR)	100	182	216	
		(us)	31.78	14.560	10.970	
	DISP	(DOT)	640	1152	1280	
		(CHR)	80	144	160	
		(us)	25.42	11.52	8.13	
	FRONT	(DOT)	16	32	64	
		(us)	0.64	0.320	0.406	
	SYNC PULSE	(DOT)	96	128	160	
		(us)	3.81	1.280	1.016	
	BACK	(DOT)	48	144	224	
		(us)	1.91	1.440	1.42	
V	CELL SIZE	(H)	16	15	16	
	TOTAL	(H)	525	915	1072	
		(ms)	16.683	13.322	11.762	
	DISP	(H)	240	870	960	
		(CHR)	15	58	60	
		(ms)	7.627	12.667	10.531	
	FRONT	(H)	10	3	33	
		(ms)	0.318	0.044	0.363	
	SYNC PULSE	(H)	2	3	3	
		(ms)	0.064	0.044	0.033	
	BACK	(H)	273	39	78	
		(ms)	8.675	0.568	0.856	
	INTERLACE		NON	NON	NON	
	POLARITY	(H/V)	NEG/NEG	NEG/NEG	POS/POS	
	COMPOSITE SYNC		-	Yes	-	
	COMPOSITE VIDEO		-	Green	-	
	CHARACTER FONT		7*9	7*9	7*9	
	SERRATION		OFF	ON	OFF	
	EQP		OFF	OFF	OFF	

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Adjustment / Inspection Signal (8)

	PROGRAM No.		101	102	103	104
	SIGNAL NAME		PC98 640*400 @70Hz R	VESA 800*600 @56Hz	VESA 800*600 @60Hz	VESA 640*480 @75Hz R
	RESOLUTION		640*400	800*600	800*600	640*480
	DOT CLOCK	(MHz)	25.175	36.000	40.000	31.5
	fh	(kHz)	31.469	35.16	37.88	37.5
	fv	(Hz)	70.086	56.25	60.32	75.00
H	CELL SIZE	(DOT)	8	8	8	8
	TOTAL	(DOT)	800	1024	1056	840
		(CHR)	100	128	132	105
		(us)	31.778	28.44	26.40	26.67
	DISP	(DOT)	640	800	800	640
		(CHR)	80	100	100	80
		(us)	25.422	22.22	20.00	20.32
	FRONT	(DOT)	17	24	40	16
		(us)	0.675	0.67	1.00	0.51
	SYNC PULSE	(DOT)	64	72	128	64
		(us)	2.542	2.00	3.20	2.03
	BACK	(DOT)	79	128	88	120
		(us)	3.138	3.56	2.20	3.81
V	CELL SIZE	(H)	16	16	16	16
	TOTAL	(H)	449	625	628	500
		(ms)	14.268	17.778	16.579	13.333
	DISP	(H)	400	600	600	480
		(CHR)	25	37.5	37.5	30
		(ms)	12.711	17.067	15.840	12.800
	FRONT	(H)	13	1	1	1
		(ms)	0.413	0.028	0.026	0.027
	SYNC PULSE	(H)	2	2	4	3
		(ms)	0.064	0.057	0.106	0.080
	BACK	(H)	34	22	23	16
		(ms)	1.080	0.626	0.607	0.427
	INTERLACE		NON	NON	NON	NON
	POLARITY	(H/V)	POS/POS	POS/POS	POS/POS	POS/POS
	COMPOSITE SYNC		-	-	-	-
	COMPOSITE VIDEO		-	-	-	-
	CHARACTER FONT		7*9	7*9	7*9	7*9
	SERRATION		OFF	OFF	OFF	OFF
	EQP		OFF	OFF	OFF	OFF

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Adjustment / Inspection Signal (9)

	PROGRAM NO.		105	106	107	108
	SIGNAL NAME		XGA (8514A)	1024*768 @56Hz	VESA 1024*768 @60Hz	GTF 640*480 @100Hz (N/N)
	RESOLUTION		1024*768	1024*768	1024*768	640*480
	DOT CLOCK	(MHz)	44.9	60.490	65.000	43.163
	fh	(kHz)	35.52	45.01	48.36	50.900
	fv	(Hz)	43.48	55.98	60.00	100.00
H	CELL SIZE	(DOT)	8	8	8	8
	TOTAL	(DOT)	1264	1344	1344	848
		(CHR)	158	168	168	106
		(us)	28.15	22.22	20.67	19.65
	DISP	(DOT)	1024	1024	1024	640
		(CHR)	128	128	128	80
		(us)	22.81	16.93	15.75	14.83
	FRONT	(DOT)	8	24	24	40
		(us)	0.18	0.40	0.37	0.93
	SYNC PULSE	(DOT)	176	136	136	64
		(us)	3.92	2.25	2.09	1.48
	BACK	(DOT)	56	160	160	104
		(us)	1.25	2.65	2.46	2.41
V	CELL SIZE	(H)	16	16	16	16
	TOTAL	(H)	408	804	806	509
		(ms)	11.486	17.864	16.666	10.00
	DISP	(H)	384	768	768	480
		(CHR)	48	48	48	30
		(ms)	10.810	17.064	15.880	9.430
	FRONT	(H)	0	1	3	1
		(ms)	0.000	0.022	0.062	0.020
	SYNC PULSE	(H)	4	6	6	3
		(ms)	0.113	0.133	0.124	0.059
	BACK	(H)	20	29	29	25
		(ms)	0.563	0.644	0.600	0.491
	INTERLACE		S&VIDEO	NON	NON	NON
	POLARITY	(H/V)	POS/POS	NEG/NEG	NEG/NEG	NEG/NEG
	COMPOSITE SYNC		-	-	-	-
	COMPOSITE VIDEO		-	-	-	-
	CHARACTER FONT		7*9	7*9	7*9	7*9
	SERRATION		OFF	OFF	OFF	OFF
	EQP		OFF	OFF	OFF	OFF

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Adjustment / Inspection Signal (10)

	PROGRAM NO.		109	110	111	112
	SIGNAL NAME		800*600 @80Hz	640*480 @100Hz	VESA 1024*768 @70Hz	VESA 1024*768 @72Hz
	RESOLUTION		800*600	640*480	1024*768	1024*768
	DOT CLOCK	(MHz)	55.41	42	75	78.43
	fh	(kHz)	53.28	52.49	56.48	58.09
	fv	(Hz)	80	100.504	70.07	72.00
H	CELL SIZE	(DOT)	8	8	8	8
	TOTAL	(DOT)	1040	800	1328	1360
		(CHR)	130	100	166	170
		(us)	18.77	19.05	17.71	17.34
	DISP	(DOT)	800	640	1024	1024
		(CHR)	100	80	128	128
		(us)	14.44	15.24	13.65	13.06
	FRONT	(DOT)	56	8	24	56
		(us)	1.01	0.19	0.32	0.71
	SYNC PULSE	(DOT)	120	96	136	112
		(us)	2.17	2.29	1.81	1.43
	BACK	(DOT)	64	40	144	168
		(us)	1.16	0.95	1.92	2.14
V	CELL SIZE	(H)	16	16	16	16
	TOTAL	(H)	666	525	806	801
		(ms)	12.501	10.001	14.272	13.89
	DISP	(H)	600	480	768	768
		(CHR)	37.5	30	48	48
		(ms)	11.262	9.144	13.599	13.32
	FRONT	(H)	37	10	3	1
		(ms)	0.694	0.190	0.053	0.017
	SYNC PULSE	(H)	6	2	6	3
		(ms)	0.113	0.038	0.106	0.052
	BACK	(H)	23	33	29	29
		(ms)	0.432	0.629	0.513	0.503
	INTERLACE		NON	NON	NON	NON
	POLARITY	(H/V)	POS/POS	NEG/NEG	NEG/NEG	POS/POS
	COMPOSITE SYNC		-	-	-	-
	COMPOSITE VIDEO		-	-	-	-
	CHARACTER FONT		7*9	7*9	7*9	7*9
	SERRATION		OFF	OFF	OFF	OFF
	EQP		OFF	OFF	OFF	OFF

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Adjustment / Inspection Signal (11)

	PROGRAM NO.		113	114	115	116
	SIGNAL NAME		GTF 640*480 @120Hz (N/N)	VESA 1280*1024 @60Hz	640*480 @120Hz	VESA 1600*1200 @60Hz
	RESOLUTION		640*480	1280*1024	640*480	1600*1200
	DOT CLOCK	(MHz)	52.406	108	50.408	162
	fh	(kHz)	61.80	63.98	63.01	75
	fv	(Hz)	120.00	60.02	120.02	60
H	CELL SIZE	(DOT)	8	8	8	8
	TOTAL	(DOT)	848	1688	800	2160
		(CHR)	106	211	100	270
		(us)	16.18	15.63	15.87	13.33
	DISP	(DOT)	640	1280	640	1600
		(CHR)	80	160	80	200
		(us)	12.21	11.85	12.70	9.88
	FRONT	(DOT)	40	48	8	64
		(us)	0.76	0.44	0.16	0.40
	SYNC PULSE	(DOT)	64	112	96	192
		(us)	1.22	1.04	1.90	1.19
	BACK	(DOT)	104	248	40	304
		(us)	1.98	2.30	0.79	1.88
V	CELL SIZE	(H)	16	16	16	16
	TOTAL	(H)	515	1066	525	1250
		(ms)	8.333	16.661	8.332	16.667
	DISP	(H)	480	1024	480	1200
		(CHR)	30	64	30	75
		(ms)	7.767	16.005	7.618	16.00
	FRONT	(H)	1	1	10	1
		(ms)	0.016	0.016	0.159	0.013
	SYNC PULSE	(H)	3	3	2	3
		(ms)	0.049	0.047	0.032	0.040
	BACK	(H)	31	38	35	46
		(ms)	0.502	0.594	0.558	0.613
	INTERLACE		NON	NON	NON	NON
	POLARITY	(H/V)	NEG/NEG	POS/POS	NEG/NEG	POS/POS
	COMPOSITE SYNC		-	-	-	-
	COMPOSITE VIDEO		-	-	-	-
	CHARACTER FONT		7*9	7*9	7*9	7*9
	SERRATION		OFF	OFF	OFF	OFF
	EQP		OFF	OFF	OFF	OFF

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Adjustment / Inspection Signal (12)

	PROGRAM NO.		117	118	119	120
	SIGNAL NAME		800*600 @120Hz	VESA 1792*1344 @60Hz (N/N)	VESA 1280*960 @85Hz	640*480 @160Hz
	RESOLUTION		800*600	1792*1344	1280*960	640*480
	DOT CLOCK	(MHz)	79.35	204.75	148.5	67.76
	fh	(kHz)	75.70	83.61	85.938	81.43
	fv	(Hz)	120	59398	85.002	160
H	CELL SIZE	(DOT)	8	8	8	8
	TOTAL	(DOT)	1048	2448	1728	832
		(CHR)	132	306	216	104
		(us)	13.21	11.96	11.636	12.28
	DISP	(DOT)	800	1792	1280	640
		(CHR)	100	224	160	80
		(us)	10.08	8.75	8.62	9.45
	FRONT	(DOT)	32	128	64	56
		(us)	0.40	0.627	0.431	0.83
	SYNC PULSE	(DOT)	64	200	160	56
		(us)	0.81	0.98	1.077	0.83
	BACK	(DOT)	152	328	224	80
		(us)	1.91	1.60	1.508	1.18
V	CELL SIZE	(H)	16			16
	TOTAL	(H)	631	1394	1011	509
		(ms)	8.335	16.672	11.764	6.25
	DISP	(H)	600	1344	960	480
		(CHR)	37.5	84	60	30
		(ms)	7.926	16.074	11.171	5.894
	FRONT	(H)	1	1	1	1
		(ms)	0.013	0.012	0.012	0.012
	SYNC PULSE	(H)	3	3	3	3
		(ms)	0.040	0.036	0.035	0.037
	BACK	(H)	27	46	47	25
		(ms)	0.357	0.550	0.547	0.307
	INTERLACE		NON	NON	NON	NON
	POLARITY	(H/V)	NEG/NEG	NEG/NEG	POS/POS	NEG/NEG
	COMPOSITE SYNC		-	-	-	-
	COMPOSITE VIDEO		-	-	-	-
	CHARACTER FONT		7*9	7*9	7*9	7*9
	SERRATION		OFF	OFF	OFF	OFF
	EQP		OFF	OFF	OFF	OFF

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Adjustment / Inspection Signal (13)

	PROGRAM NO.		121	122	123	124
	SIGNAL NAME		VESA 1600*1200 @70Hz	VESA 1920*1440 @60Hz (N/N)	1024*768 @120Hz	VESA 1792*1344 @75Hz (N/N)
	RESOLUTION		1600*1200	1920*1440	1024*768	1792*1344
	DOT CLOCK	(MHz)	189	234.00	125.95	261.00
	fh	(kHz)	87.5	90.01	95.97	106.27
	fv	(Hz)	70	60.01	120	75.00
H	CELL SIZE	(DOT)	8	8	8	8
	TOTAL	(DOT)	2160	2600	1312	2456
		(CHR)	270	325	164	307
		(us)	11.429	11.11	10.42	9.41
	DISP	(DOT)	1600	1920	1024	1792
		(CHR)	200	240	128	224
		(us)	8.466	8.21	8.13	6.87
	FRONT	(DOT)	64	128	16	96
		(us)	0.339	0.55	0.13	0.368
	SYNC PULSE	(DOT)	192	208	96	216
		(us)	1.016	0.89	0.76	0.83
	BACK	(DOT)	304	344	176	352
		(us)	1.608	1.47	1.40	1.35
V	CELL SIZE	(H)	16	16	16	16
	TOTAL	(H)	1250	1500	800	1417
		(ms)	14.286	16.66	8.336	13.334
	DISP	(H)	1200	1440	768	1344
		(CHR)	75	90	48	168
		(ms)	13.714	15.56	8.002	12.647
	FRONT	(H)	1	1	1	1
		(ms)	0.011	0.004	0.010	0.009
	SYNC PULSE	(H)	3	3	3	3
		(ms)	0.034	0.033	0.031	0.028
	BACK	(H)	46	56	28	69
		(ms)	0.526	0.622	0.292	0.649
	INTERLACE		NON	NON	NON	NON
	POLARITY	(H/V)	POS/POS	NEG/NEG	POS/POS	NEG/NEG
	COMPOSITE SYNC		-	-	-	-
	COMPOSITE VIDEO		-	-	-	-
	CHARACTER FONT		7*9	7*9	7*9	7*9
	SERRATION		OFF	OFF	OFF	OFF
	EQP		OFF	OFF	OFF	OFF

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Adjustment / Inspection Signal (14)

	PROGRAM NO.	125	126	127	128
	SIGNAL NAME	VESA 1280*1024 @100Hz	XGA2 1024*768	Mac	Mac
	RESOLUTION	1280*1024			
	DOT CLOCK (MHz)	185.24			
	fh (kHz)	107.18			
	fv (Hz)	100			
H	CELL SIZE (DOT)	8			
	TOTAL (DOT)	1728			
	(CHR)	216			
	(us)	9.33			
	DISP (DOT)	1280			
	(CHR)	160			
	(us)	6.91			
	FRONT (DOT)	64			
	(us)	0.346			
	SYNC PULSE (DOT)	160			
	(us)	0.86			
	BACK (DOT)	224			
	(us)	1.21			
V	CELL SIZE (H)	16			
	TOTAL (H)	1072			
	(ms)	11.761			
	DISP (H)	1024			
	(CHR)	64			
	(ms)	11.235			
	FRONT (H)	1			
	(ms)	0.011			
	SYNC PULSE (H)	3			
	(ms)	0.033			
	BACK (H)	44			
	(ms)	0.483			
	INTERLACE	NON			
	POLARITY (H/V)	POS/POS			
	COMPOSITE SYNC	-			
	COMPOSITE VIDEO	-			
	CHARACTER FONT	7*9			
	SERRATION	OFF			
	EQP	OFF			

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3. Position of Connectors and Test point for Adjustment and Inspection

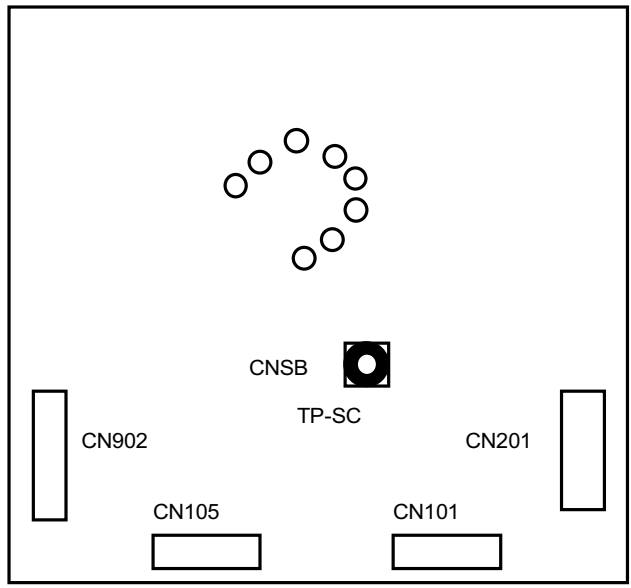

Fig. 3-1 VIDEO PWB

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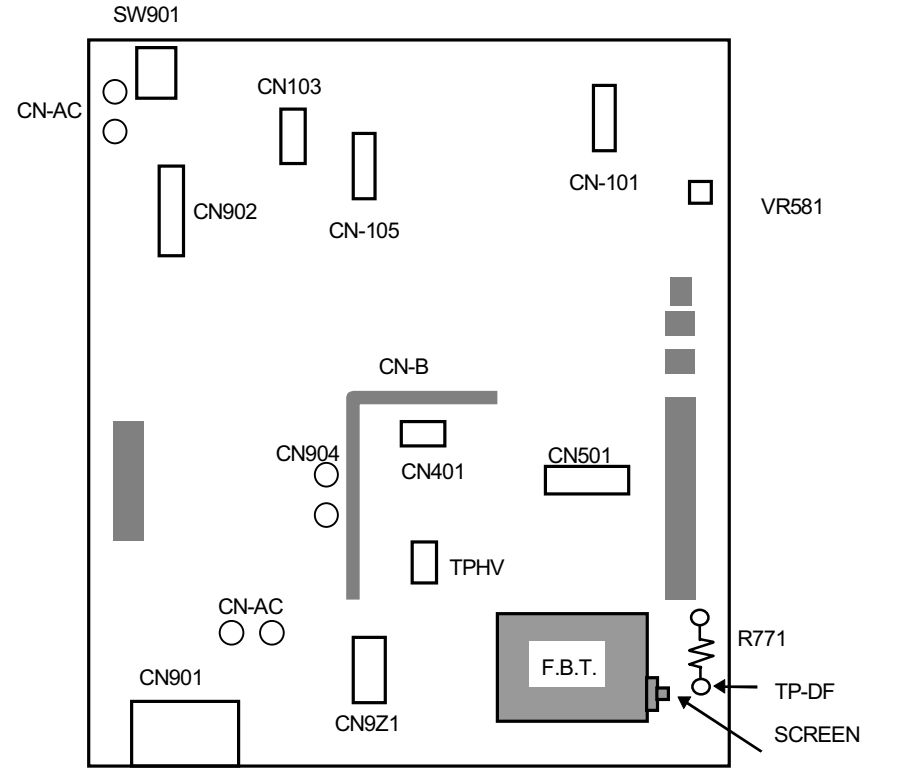

Fig. 3-2 MAIN PWB

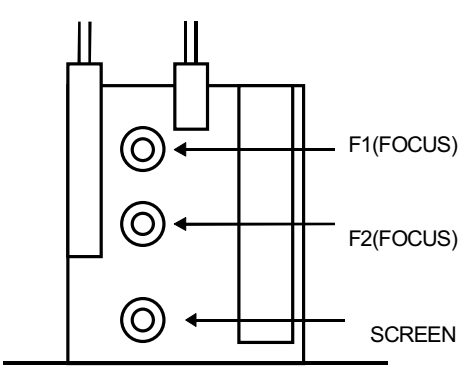

Fig. 3-3 F.B.T VR

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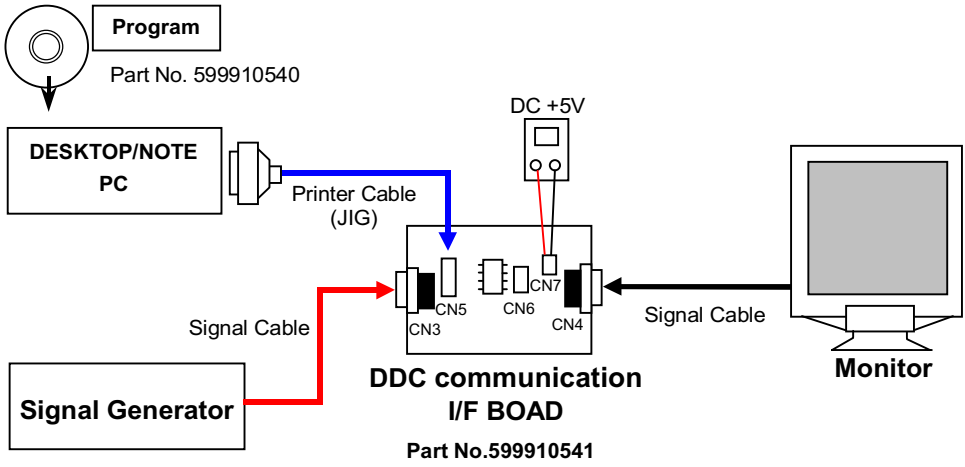
INSPECTION

1. Inspection of PLUG & PLAY communication

1-1. A construction of System

This system should be connected as shown below.



1-2. Input signal

Horizontal sync frequency: Not specified.

Vertical sync frequency: Not specified.

1-3. Programs required

PNP WRITE & INSPECTION S/W(Part No. 599910540)

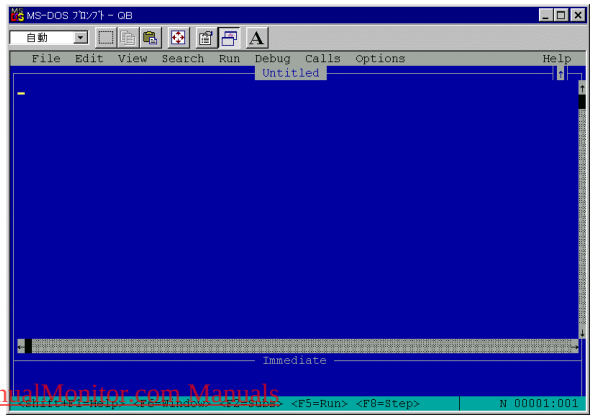
1-4. Inspection procedures

a. "QB45" directory is made in the C drive.

b. Copy the above-mentioned programs in a QB45 directory.

c. Set up the MO-DOS mode. (DOS Prompt of Windows95/98 is also acceptable.)

d. Execute the QB.EXE from the command line.



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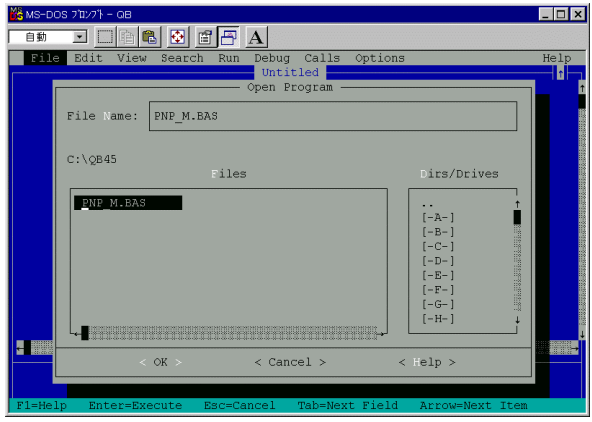
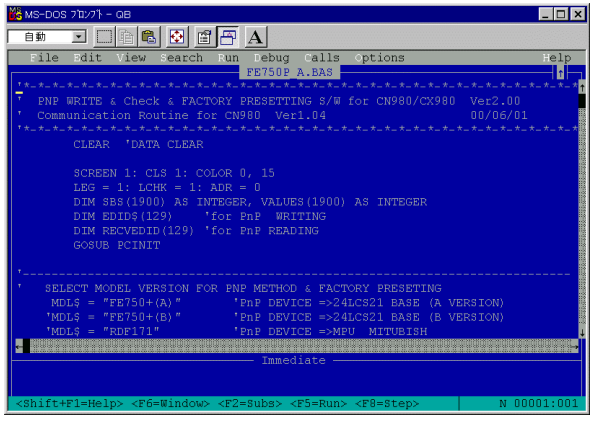
e. To open Open program Panel, Point to File, and then click Open program... .

f. Click the Files(DP730) you want to open, and then click <OK>.



g. press on F5 key (RUN) starts a program.


MS-DOS プロンプト - QB
File Edit View Search Run Debug Calls Options Help
FE750P_A.BAS
PNP WRITE & Check & FACTORY PRESETTING S/W for CN980/CX980 Ver2.00
Communication Routine for CN980 Ver1.04 00/06/01
CLEAR 'DATA CLEAR
SCREEN 1: CLS 1: COLOR 0, 15
LEG = 1: LCHK = 1: ADR = 0
DIM SBS(1900) AS INTEGER, VALUES(1900) AS INTEGER
DIM EDID$(129) 'for PnP WRITING
DIM RECVEDID(129) 'for PnP READING
GOSUB PCINIT
SELECT MODEL VERSION FOR PNP METHOD & FACTORY PRESETING
MDL$ = "FE750+(A)" 'PnP DEVICE =>24LCS21 BASE (A VERSION)
'MDL$ = "FE750+(B)" 'PnP DEVICE =>24LCS21 BASE (B VERSION)
'MDL$ = "RDF171" 'PnP DEVICE =>MPU MITUBISH
Immediate
<Shift+F1=Help> <F6=Window> <F2=Subs> <F5=Run> <F8=Step>
N 00001:001

h. If the screen shown below is displayed, Enter key is pressed.

PNP WRITE & INSPECTION S/W

*****/CN980/CX980 MP

VER. 2.0

<MONITOR TYPE>...DP730

AJ.ANT.=0

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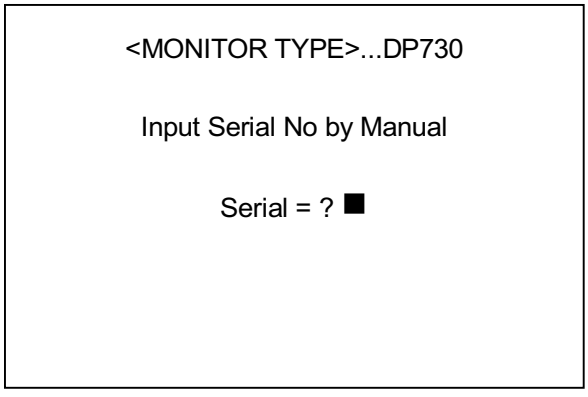
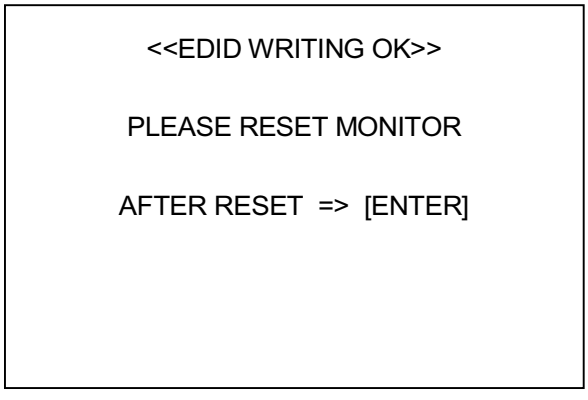
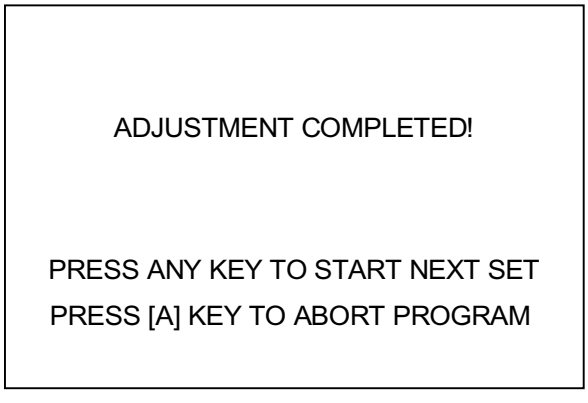
i Check the serial number of the set and enter an input of the following code from the keyboard.



j. Press the Enter key. Then, the EDID data, OSM model name, and the serial number begin to be written in.



k. The following screen is displayed after write is completed normally.



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1-5. EDID data file

The EDID data file text is shown below. When you write or inspect EDID for this monitor, the following table can be used.

file name : DP730

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	34	AC	20	45	01	01	01	01
10	2C *1)	0A *2)	01	02	0C	21	18	78	E9	20	78	A0	56	48	9A	26
20	12	48	4C	FF	FF	80	31	59	45	59	61	59	71	4F	81	59
30	81	99	A9	4A	01	01	1A	4F	40	30	62	B0	32	40	40	C0
40	13	00	3B	EC	10	00	00	1E	00	00	00	FD	00	37	A0	1F
50	60	16	00	0A	20	20	20	20	20	20	00	00	00	FC	00	4A
60	43	2D	31	37	57	34	31	0A	20	20	20	20	00	00	00	FF
70	00	38 *3)	36	30	30	30	30	31	52	41	0A	20	20	20	00	E2 *4)

Table 1-5. Data list

Note 1: address 10h — Week of manufacture = Month of manufacture × 4

Note 2: address 11h — Year of manufacture - 1990

Notes 3: address 71h ~ 7Dh — Serial Number (ASCII coded)

If less than 13 char, terminate with 0Ah and fill the rests with 20h.

Note 4: address 7Fh — Checksum

The sum of entire 128 byte shall be equal to 00h.

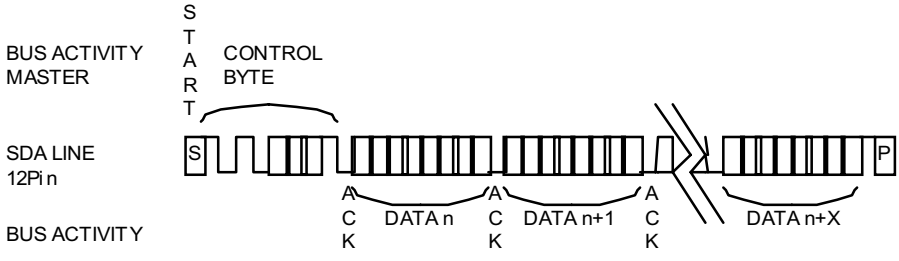

Diagram 1-5 Timing chart of DDC2B

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2. CRT

[A] CRT Face plate defect

1. Inspection condition

1-1. In the operating condition, observe the defect on the screen under following condition:

9,300 K (x=0.283, y=0.297) white raster or the element monochrome raster which its brightness is 34 cd/m^2 (10 ft-L) on the screen center surrounding light is about 10 Lux.

1-2. In the non-operating condition, observe the defect of the screen under light of about 200 Lux, measured at the faceplate.

1-3. Inspection shall be made more than 45cm away from the screen.

1-4. Observe the screen on white raster and each monochrome color of red, green and blue.

2. Division zone

A screen is divided into following 2 zones.

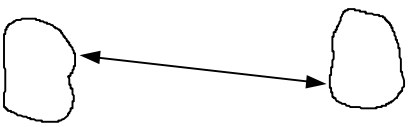
Zone A: Area inside the rectangle that its size measures H: 300mm, V: 225mm in the center of screen.

Zone B: Area outside the above rectangle.

3. Limits

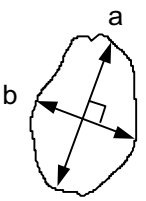
3-1. CRT face defect

1) Distance (Minimum distance)



2) Average diameter

Turn of (a + b) / 2 (a: length, b: width)



3) Limit

a) Dark spot, Blocked aparture

Average diameter (mm)	A	B	A + B	Minimum distance
0.51 ~	0	0	0	-
0.31 ~ 0.50	0	0	0	-
0.15 ~ 0.30	6 (note 1)	6 (note 1)	10 (note 1)	10mm

b) Discoloration, Stain, Missing phospher, etc.

Average diameter (mm)	A	B	A + B	Minimum distance
0.51 ~ 0.75	0	1	-	20mm
0.15 ~ 0.50	2	3	-	20mm

Note 1: No missing spot large than specified are allowed in Zone A.

Note 2:The spec applies to each color.

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3-2. Face plate defect

1) Blisters, opaque spots and elongated closed blisters

Average diameter (*1) (mm)	Allowable number (pcs)			Minimum Separation (mm)
	Zone A	Zone B	A + B	
0.76	0	0	0	30
0.51 ~ 0.75	0	1	1	
0.26 ~ 0.50	2	3	5	
0.11 ~ 0.25	-	-	-	(*2)

Note (*1) Mean diameter shall be either one of the following values, which is smaller.

(a+b)/2 or a/20+2b (a: length, b: width)

Note (*2) Maximum 5 pcs. In area of Φ 10mm.

2) Scratch

Width (mm)	Allowable Length (mm)
0.16 ~	Rejected
0.11 ~ 0.15	3
0.06 ~ 0.10	26
~ 0.05	Unlimited

3) Other glass defect

Flaw, crack and lack cannot be distinguish easily by naked eye.

Iron rust conforms to limited sample.

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[B] AR-film's surface defect

1. Inspection conditions

1) Put a valve on an inspective stand and Illuminate it from the top with white fluorescent light.

2) Valve surface illuminance is more than 1000Lux and less than 1000Lux.

3) Observe from distance of 40cm from surface, disregard flaws which can not be distinguished from this distance.

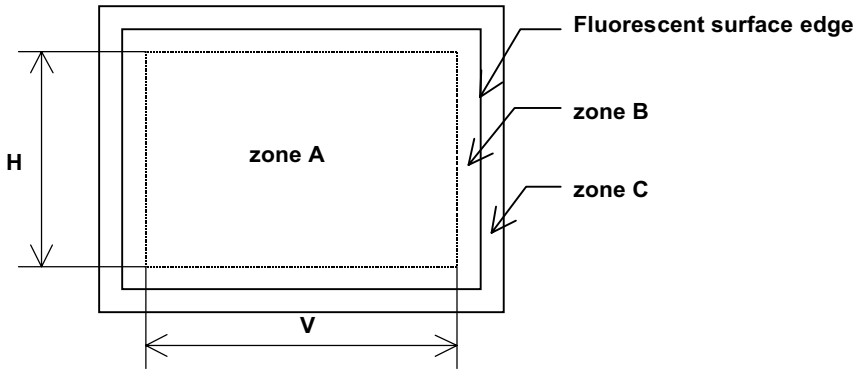
2. Division of zone

A screen is divided into following 3 zones.

Zone A: Area inside the rectangle that its size measures H : 300mm, V : 225mm in the center of screen.

Zone B: Area outside zone A and inside the fluorescent surface edge.

Zone C: Area outside the fluorescent surface edge.



3. Limits

3-1. Scratch

Width (mm)	Allowable Length(mm)(Zone A + Zone B)
0.16 ~	Reject
0.11 ~ 0.15	13
0.06 ~ 0.10	26
~ 0.05	Unlimited

Note 1: Even though width of scratch is more than 0.16mm, regard scratch whose contrast is weak extremely as stain and apply standard of 3-2.

Note 2: Do not recognize flaws which injures goods prices though it is not especially stipulated as for zone C.

3-2. Opaque flaws (ex. Stain) and coating peeling

Do not apply the following standard to zone C.

Classify flaws by contrast and judge it by size every the contrast.

Definition of contrast

High contrast : The foreign substance which shuts off light from fluorescence surface.

Middle contrast : A semitransparent foreign substance and stain.
(ex. coating material which has been changed)

Low contrast : stain and dust which do not reflect light from fluorescence surface and can be distinguished by its appearance.

Note : Ignore the light spot with no interference color.

(However, Non of them with its size in excess of 3.75 mm is acceptable, that damages the product quality.)

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Standards

Average diameter classified by a contrast (Note 1) (mm)			Allowable number		Allowable Length (mm)
High contrast	Middle contrast	Low contrast	Zone A	Zone B	
~ 0.10	~ 0.20	~ 0.50	Ignore	Ignore	-
0.11 ~ 0.25	0.21 ~ 0.50	0.51 ~ 1.25	2 [4]	4 [5]	20
0.26 ~ 0.50	0.51 ~ 1.00	1.26 ~ 2.50	1 [4]	2 [4]	40
0.51 ~ 0.75	1.01 ~ 1.50	2.51 ~ 3.75	0 [4]	1 [4]	80

Values inside [ ] represent acceptable number in low contrast.

See the table in the next page for total defect number, which is acceptable in low contrast.

Note 1: Convert (a+b)/2 or a/20 + 2b small value into average diameter. (a: length, b: width)

total number of a low contrast flaws	Zone A	Zone B
Standard classified by zones	6	8
Total (zone A + zone B)	10	

Note 1: Acceptable interval shall be larger one in the case that defects have different interval.

Note 2: There is no standard regarding zone C. Therefore, no defect is accepted that may deteriorate the value of products. Defect level by consultation. Discuss is necessary.

Note 3: Tolerance of defect size is approx. 10%.

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TROUBLE SHOOTING

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This chapter for troubleshooting is useful if any normal conditions cannot be secured even after the confirmation of “Troubleshooting” presented in the User's Manual and the completion of “Chapter 4. Adjustment procedures“ presented in this Service Manual.

The equipment units related to the possible cause of “Picture bounces or a wavy pattern is present in the picture” described in “Troubleshooting” presented in the User's Manual include the electrical equipment such as portable telephones, etc., which may generate electromagnetic waves. Therefore, troubleshooting actions should be taken after turning off the portable telephones, etc., and such electrical equipment that may generate electromagnetic waves, or in a place distant from such equipment.

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1. No raster generated

Check the LED.

When the LED blinks in ORANGE.→Check for Item 5, Self-diagnostic functions.

The LED is lit in ORANGE.

Check the HS and VS lines.

Measure the potential between Pin 1 (HS) and Pin 3 (VS) of CN-105 on the MAIN PWB.

Horizontal period (HS)
Vertical period (VS)

NG

Failure point
1) CN-105 is failure. 2) ZD161 on the MAIN PWB or (HS) (VS) line on the CRT PWB or peripheral circuits are failure. 3) signal cables are failure.

OK

No LED lighting.

The LED is lit in GREEN.

Failure point
Q16A, Q16E, IC100 on the MAIN PWB or peripheral circuits are failure.

Check the 5V line. Pin 30 of IC100, the emitter of Q9F1.

NG

Check the 8V line. (C9D1+ side)

NG

Failure point
The power circuit is failure. (See Item 4-1.)

OK

Failure point
Q9F1 on the MAIN PWB or peripheral circuits are failure.

OK

Failure point
The MPU of IC100 is failure or peripheral circuits are failure.

Check high-voltage operation.

This judgment should be based on the sound generated when the power switch is turned on or in terms of electrostatic charges.

NG

Check the AFC line.

Check the potential at the emitter of Q562 on the MAIN PWB or Pin 3 of IC701.

OK

Failure point
The high-voltage circuit is failure. (See Item 4-4.)

NG

Failure point
Q562 or the horizontal OSC/ deflection circuit is failure. (See Item 4-2.)

OK

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CONTINUE

Is the high voltage maintained at about 25kV?

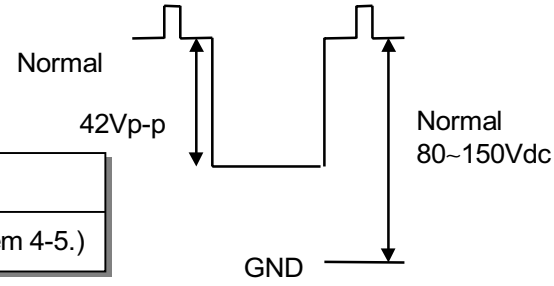
NG

Failure point
1) IC701, R741, D741, or peripheral circuits are failure. 2) R721, C721, D704, T711 (FBT), Q711, or peripheral circuits are failure.

OK

Check the R/G/B video output.

Measure the R/G/B video output at TP-R, TP-G, and TP-B on the CRT PWB.



NG

Failure point
The video circuit is failure. (See Item 4-5.)

OK

Check the heater voltage.

Measure the (heater) voltage at Pin 4 of CN-902 on the CRT PWB.

NG

Failure point
CN-902 or peripheral circuits are failure.

OK

Check the screen voltage.

Measure the voltage at TP-SC on the CRT PWB.
Usually, the screen voltage is 700±10V.

NG

Failure point
T711 (FBT), CRT socket, or screen leads are failure.

OK

Failure point
The CRT socket or the CRT is failure.

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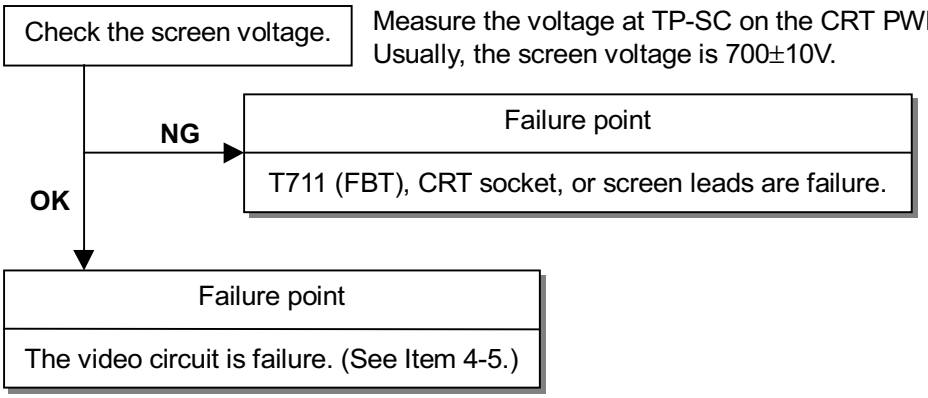
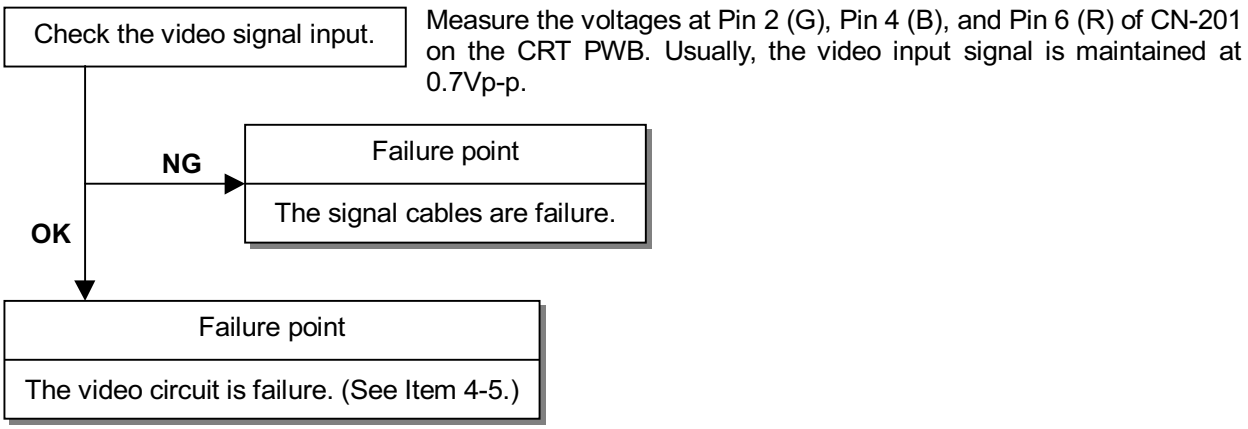
2. Screen errors

2-1. Raster brightness failure


Check the screen voltage.
Measure the voltage at TP-SC on the CRT PWB.
Usually, the screen voltage is 700±10V.
NG
Failure point
T711 (FBT), CRT socket, or screen leads are failure.
OK
Failure point
The video circuit is failure. (See Item 4-5.)

2-2. Image color failure or contrast failure


Check the video signal input.
Measure the voltages at Pin 2 (G), Pin 4 (B), and Pin 6 (R) of CN-201 on the CRT PWB. Usually, the video input signal is maintained at 0.7Vp-p.
NG
Failure point
The signal cables are failure.
OK
Failure point
The video circuit is failure. (See Item 4-5.)

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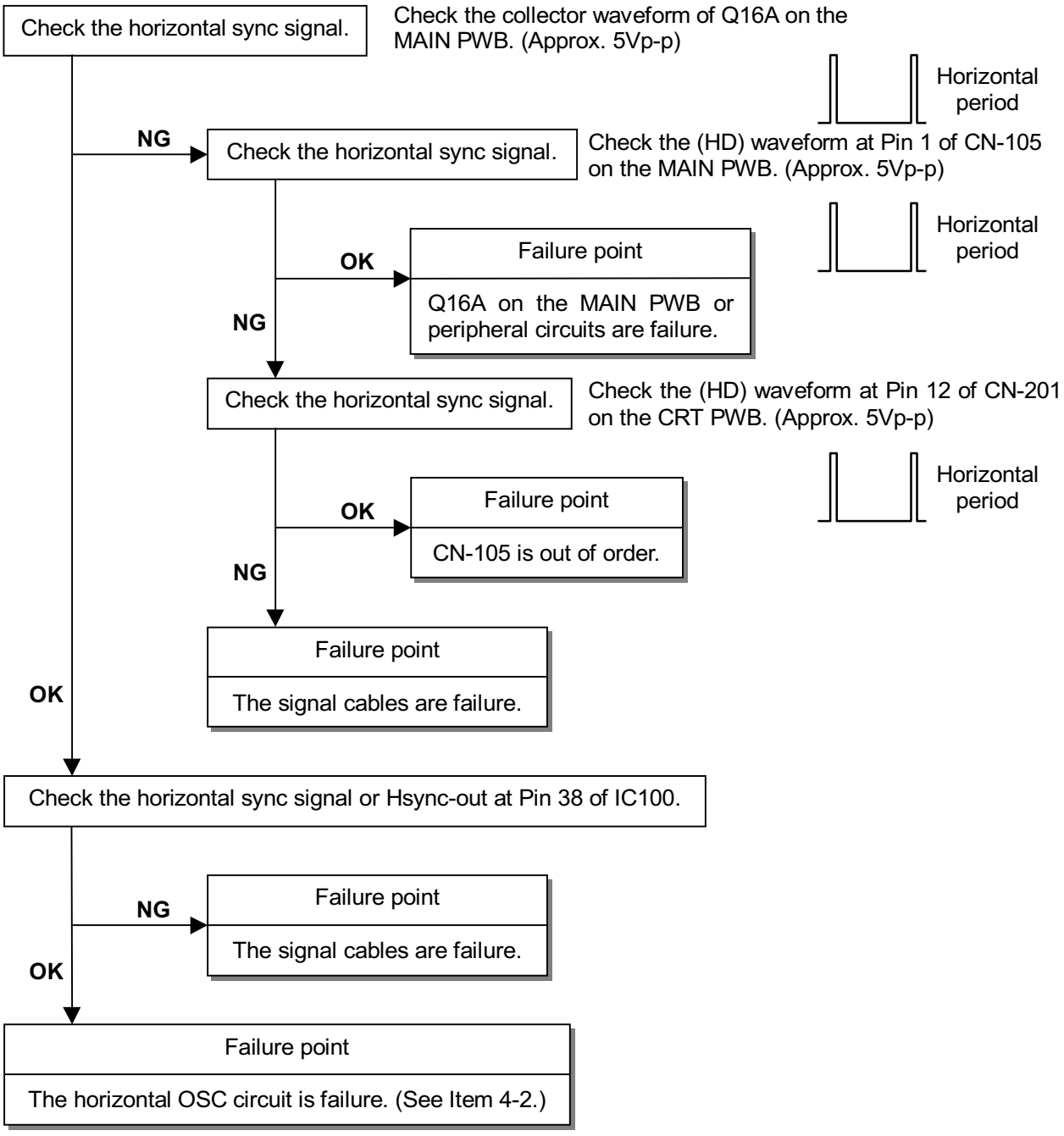
2-3. Sync failure

2-3-1. Horizontal sync unstable


Check the horizontal sync signal.
Check the collector waveform of Q16A on the MAIN PWB. (Approx. 5Vp-p)
Horizontal period
NG
Check the horizontal sync signal.
Check the (HD) waveform at Pin 1 of CN-105 on the MAIN PWB. (Approx. 5Vp-p)
Horizontal period
OK
Failure point
Q16A on the MAIN PWB or peripheral circuits are failure.
NG
Check the horizontal sync signal.
Check the (HD) waveform at Pin 12 of CN-201 on the CRT PWB. (Approx. 5Vp-p)
Horizontal period
OK
Failure point
CN-105 is out of order.
NG
Failure point
The signal cables are failure.
OK
Check the horizontal sync signal or Hsync-out at Pin 38 of IC100.
NG
Failure point
The signal cables are failure.
OK
Failure point
The horizontal OSC circuit is failure. (See Item 4-2.)

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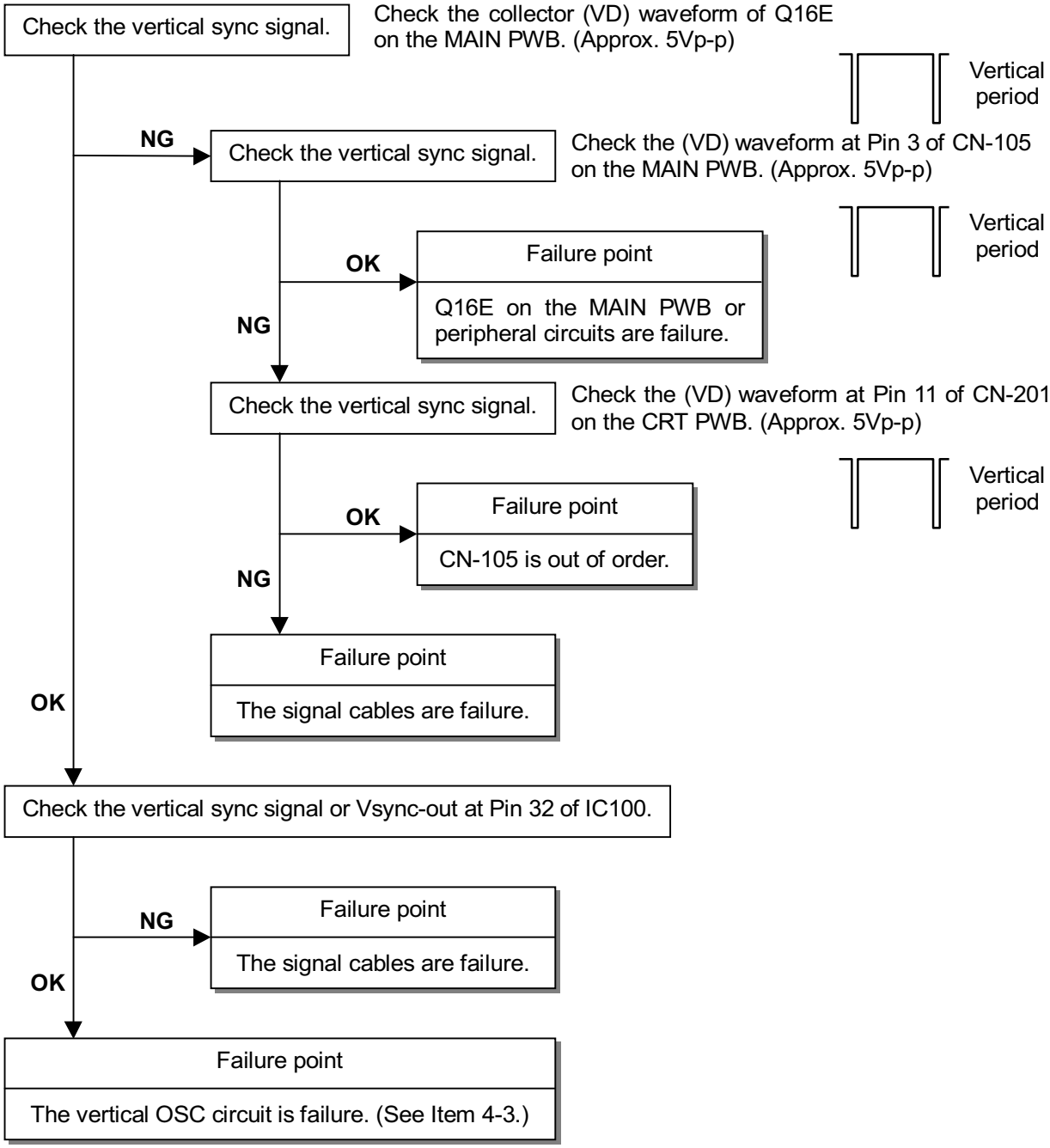
2-3-2. Vertical sync unstable


Check the vertical sync signal.
Check the collector (VD) waveform of Q16E on the MAIN PWB. (Approx. 5Vp-p)
Vertical period
NG
Check the vertical sync signal.
Check the (VD) waveform at Pin 3 of CN-105 on the MAIN PWB. (Approx. 5Vp-p)
Vertical period
OK
Failure point
Q16E on the MAIN PWB or peripheral circuits are failure.
NG
Check the vertical sync signal.
Check the (VD) waveform at Pin 11 of CN-201 on the CRT PWB. (Approx. 5Vp-p)
Vertical period
OK
Failure point
CN-105 is out of order.
NG
Failure point
The signal cables are failure.
OK
Check the vertical sync signal or Vsync-out at Pin 32 of IC100.
NG
Failure point
The signal cables are failure.
OK
Failure point
The vertical OSC circuit is failure. (See Item 4-3.)

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2-4. Screen size and screen position failure

2-4-1. Horizontal size failure

Check the voltage at Pin 14 of IC500.

Examine the duty factor of the voltage waveform observed at Pin 14 of IC500 on the MAIN PWB and confirm whether it is changed by the adjustment of horizontal size.

NG

Failure point
IC500 on the MAIN PWB or peripheral circuits are failure.

OK

Check the emitter voltage of Q504.

Examine the duty factor of the emitter voltage waveform observed in Q504 on the MAIN PWB and confirm whether it is changed by the adjustment of horizontal size.

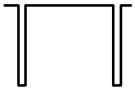
NG

Failure point
Q503, Q504, Q505 on the MAIN PWB or peripheral circuits are failure.

OK

Check the waveform at the gate of Q5G1.

Measure the waveform at the gate of Q5G1 on the MAIN PWB. (Approx. 10Vp-p)



NG

Failure point
Q5G1, D581, C5G2, R5G2 on the MAIN PWB or peripheral circuits are failure.

OK

Failure point
T561 and deflection circuit are failure. (See Item 4-2.)

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2-4-2. Horizontal position failure

(1) Video

Check the H_POSI line.

Confirm that the phase of the voltage waveform changes at Pin 17 of IC500 on the MAIN PWB as a result of the horizontal position adjustment for the OSD.

OK → Failure point: Q501, Q502, Q506 on the MAIN PWB or peripheral circuits are failure.

NG → Failure point: IC500 on the MAIN PWB or peripheral circuits are failure.

(2) Horizontal raster centering (VR581 and SW581) failure

Check the power source voltage for centering.

Check voltages between the collectors of Q581 and Q582, and between Pins 1 and 3 on the MAIN PWB. Usually, these voltages are maintained at 5±1V.

OK → Failure point: L581, R588, VR581 on the MAIN PWB or peripheral circuits are failure.

NG → Failure point: T561, R581, and R582 are failure.

2-4-3. Vertical size and position failure

Check the +15V and -14V lines.

Measure voltages at Pin 1 (-14V) and Pin 6 (+15V) of IC451 on the MAIN PWB.

NG → Failure point:
1) IC451 is failure.
2) The power circuit is failure, or R9C1 and/or R9E1 of the power circuit block are failure.

OK →

Check the potential at Pin 4 of IC500.
Check the potential at Pin 7 of IC500.

Confirm that the voltage amplitude changes within the range of about 2.0 to 3.0Vp-p at Pin 4 of IC500 on the MAIN PWB as a result of the vertical size control for the OSD.

Confirm that the voltage changes within the range of about 3.3 to 3.7Vp-p at Pin 4 of IC500 on the MAIN PWB as a result of the vertical position control for the OSD.

OK → Failure point: IC451 on the MAIN PWB or peripheral circuits are failure.

NG → Failure point: IC500 on the MAIN PWB or peripheral circuits are failure.

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2-5. Linearity failure

2-5-1. Horizontal linearity failure

Check the horizontal frequency band selector.

Check potentials at Pins 57, 59, 60, 61, 62, and 41 of IC100 on the MAIN PWB.

Horizontal frequency (kHz)	FH BAND					
	Pin 57 (Q573)	Pin 60 (Q574)	Pin 62 (Q575)	Pin 61 (Q576)	Pin 59 (Q577)	Pin 41 (Q571 base)
29.0 < fH ≤ 33.0	H	H	H	H	H	1.4V
33.0 < fH ≤ 36.5	H	L	H	H	L	1.5V
36.5 < fH ≤ 41.0	H	H	L	L	H	1.6V
41.0 < fH ≤ 45.0	L	H	H	H	L	1.6V
45.0 < fH ≤ 47.4	L	L	H	H	L	1.8V
47.4 < fH ≤ 51.0	L	H	L	H	H	1.9V
51.0 < fH ≤ 55.0	L	H	L	H	H	1.9V
55.0 < fH ≤ 58.5	L	H	L	L	H	2.1V
58.5 < fH ≤ 62.0	L	L	L	L	H	2.5V
62.0 < fH ≤ 70.0	L	H	L	H	L	2.7V
70.0 < fH ≤ 77.0	L	H	L	L	L	3.2V
77.0 < fH ≤ 80.5	L	L	L	H	L	3.4V
80.5 < fH ≤ 83.5	L	L	L	H	L	3.5V
83.5 < fH ≤ 92.0	L	L	L	L	L	3.8V
92.0 < fH ≤ 97.0	L	L	L	L	L	3.9V

NG → Failure point: IC801 on the MAIN PWB or peripheral circuits are failure.

OK

- Relating Character S capacitor changeover
  Q573, Q574, Q575, Q576, Q577, C575, C577, C578, C579, C57A, C573, C574 on the MAIN PWB or peripheral circuits are failure.
- Relating linearity coil control
  Q571, Q572, T571

2-5-2. Vertical linearity failure

Check the potential at Pin 4 of IC500.

Check how the voltage waveform at Pin 4 of IC500 on the MAIN PWB changes in the shape of Character C when up and down balance control is carried out for OSD linearity.
Check how the voltage waveform at Pin 4 of IC500 on the MAIN PWB changes in the shape of Character S when vertical balance control is carried out for OSD linearity.

NG → Failure point: IC500 on the MAIN PWB or peripheral circuits are failure.

OK

Failure point: IC461 on the MAIN PWB or peripheral circuits are failure.

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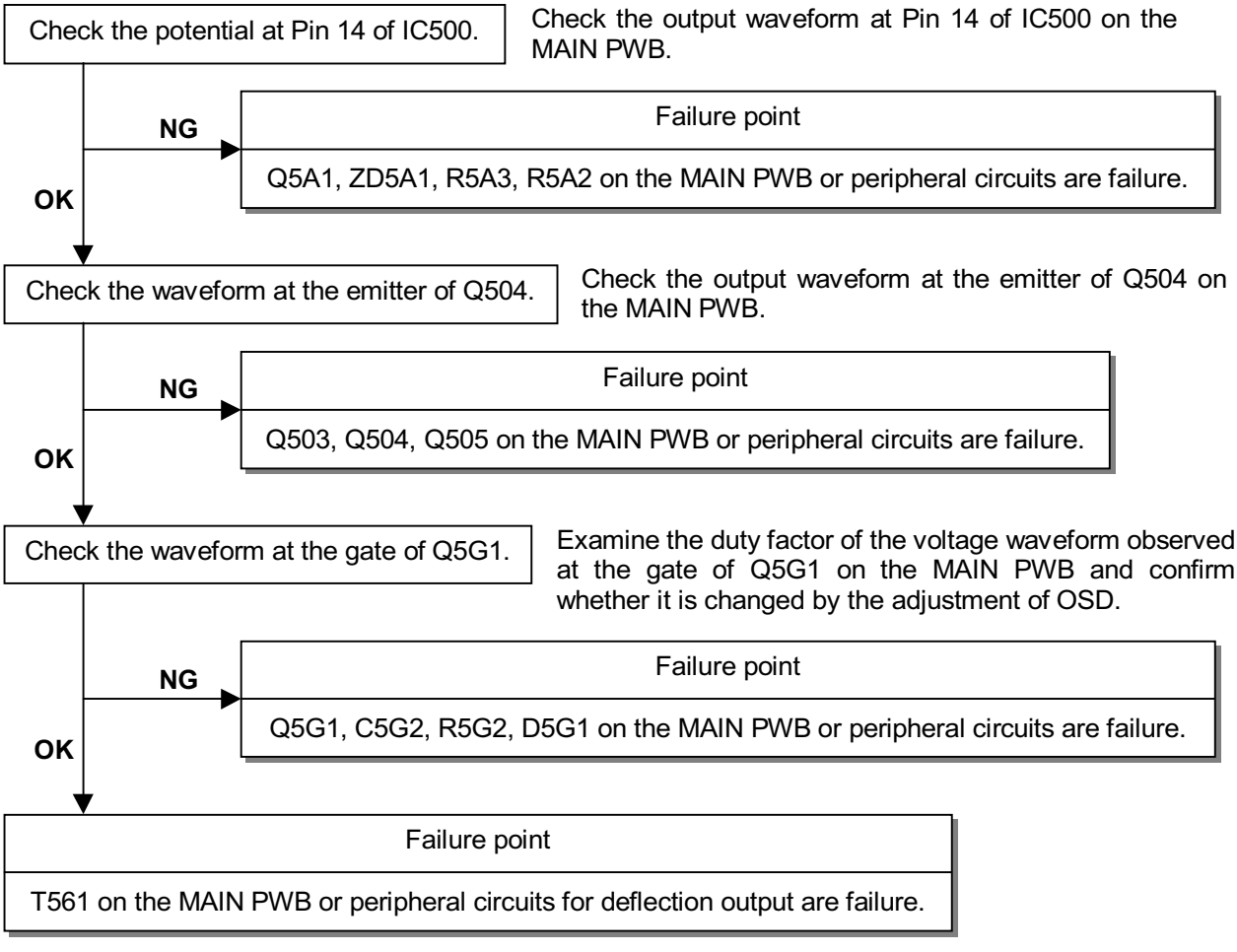
2-6. Distortion corrector circuit failure

2-6-1. Side pin, trapezoid, and corner distortion failure


Check the potential at Pin 14 of IC500.
Check the output waveform at Pin 14 of IC500 on the MAIN PWB.
NG
Failure point
Q5A1, ZD5A1, R5A3, R5A2 on the MAIN PWB or peripheral circuits are failure.
OK
Check the waveform at the emitter of Q504.
Check the output waveform at the emitter of Q504 on the MAIN PWB.
NG
Failure point
Q503, Q504, Q505 on the MAIN PWB or peripheral circuits are failure.
OK
Check the waveform at the gate of Q5G1.
Examine the duty factor of the voltage waveform observed at the gate of Q5G1 on the MAIN PWB and confirm whether it is changed by the adjustment of OSD.
NG
Failure point
Q5G1, C5G2, R5G2, D5G1 on the MAIN PWB or peripheral circuits are failure.
OK
Failure point
T561 on the MAIN PWB or peripheral circuits for deflection output are failure.

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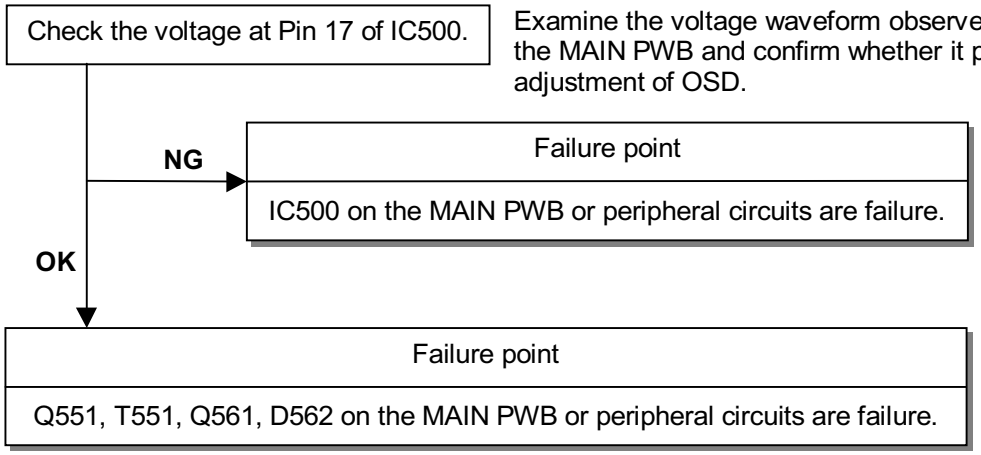
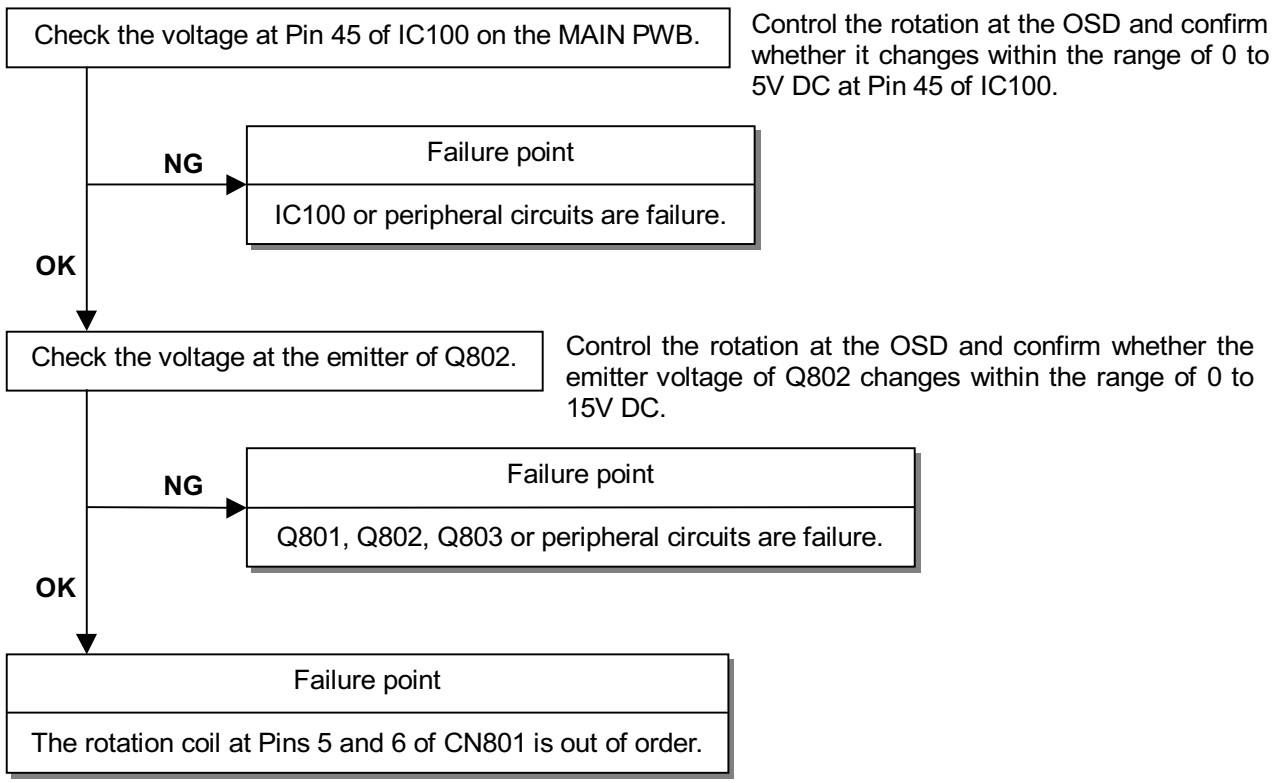
2-6-2. Side pin balance, parallelogram distortion, and corner balance failure


Check the voltage at Pin 17 of IC500.
Examine the voltage waveform observed at Pin 17 of IC500 on the MAIN PWB and confirm whether it phase is changed by the adjustment of OSD.
NG
Failure point
IC500 on the MAIN PWB or peripheral circuits are failure.
OK
Failure point
Q551, T551, Q561, D562 on the MAIN PWB or peripheral circuits are failure.

2-6-3. Screen rotation failure


Check the voltage at Pin 45 of IC100 on the MAIN PWB.
Control the rotation at the OSD and confirm whether it changes within the range of 0 to 5V DC at Pin 45 of IC100.
NG
Failure point
IC100 or peripheral circuits are failure.
OK
Check the voltage at the emitter of Q802.
Control the rotation at the OSD and confirm whether the emitter voltage of Q802 changes within the range of 0 to 15V DC.
NG
Failure point
Q801, Q802, Q803 or peripheral circuits are failure.
OK
Failure point
The rotation coil at Pins 5 and 6 of CN801 is out of order.

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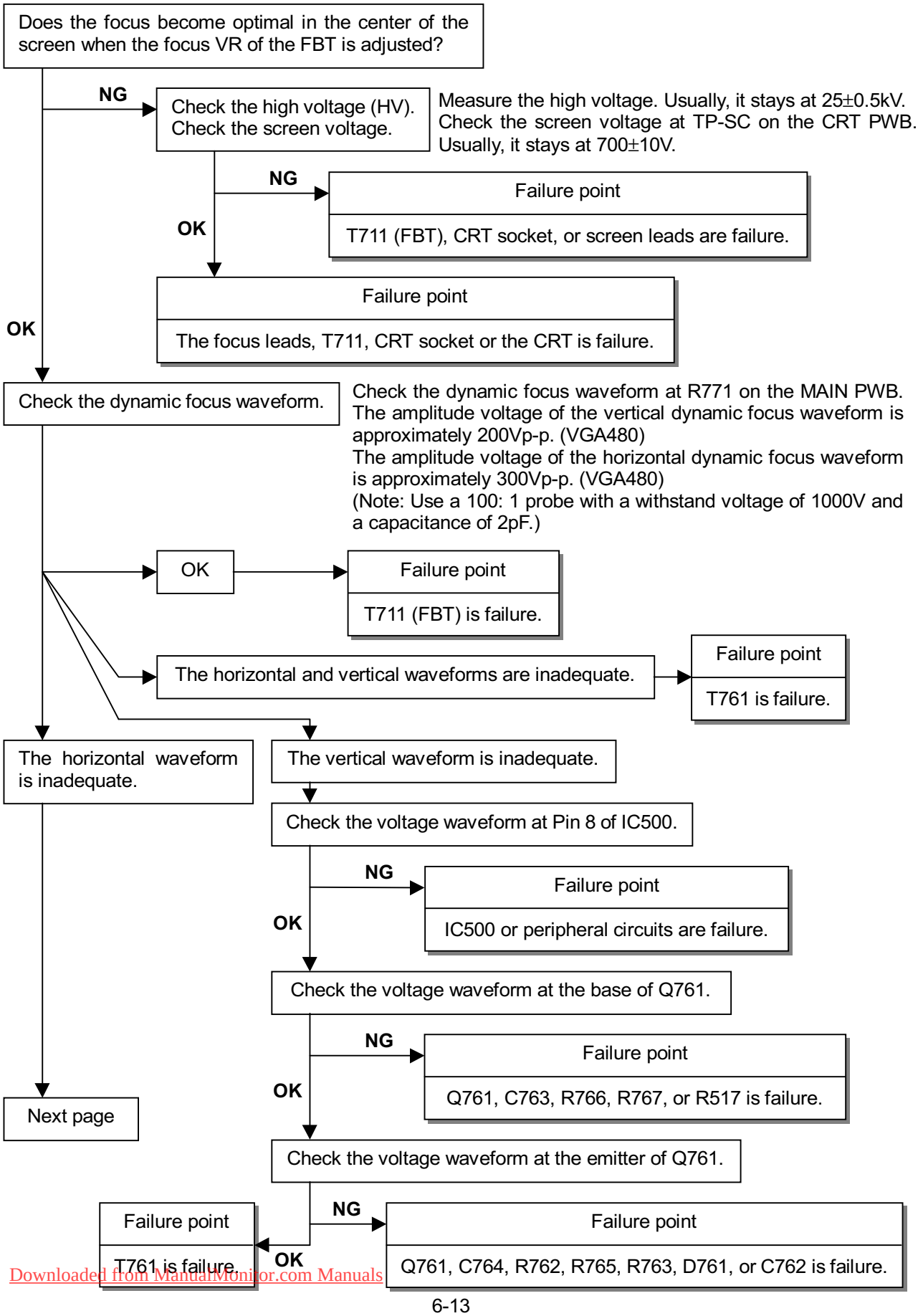
2-7. Focus failure


Does the focus become optimal in the center of the screen when the focus VR of the FBT is adjusted?
NG
Check the high voltage (HV). Check the screen voltage.
Measure the high voltage. Usually, it stays at 25±0.5kV. Check the screen voltage at TP-SC on the CRT PWB. Usually, it stays at 700±10V.
NG
Failure point
T711 (FBT), CRT socket, or screen leads are failure.
OK
Failure point
The focus leads, T711, CRT socket or the CRT is failure.
OK
Check the dynamic focus waveform.
Check the dynamic focus waveform at R771 on the MAIN PWB. The amplitude voltage of the vertical dynamic focus waveform is approximately 200Vp-p. (VGA480)
The amplitude voltage of the horizontal dynamic focus waveform is approximately 300Vp-p. (VGA480)
(Note: Use a 100: 1 probe with a withstand voltage of 1000V and a capacitance of 2pF.)
OK
Failure point
T711 (FBT) is failure.
The horizontal and vertical waveforms are inadequate.
Failure point
T761 is failure.
The horizontal waveform is inadequate.
The vertical waveform is inadequate.
Check the voltage waveform at Pin 8 of IC500.
NG
Failure point
IC500 or peripheral circuits are failure.
OK
Check the voltage waveform at the base of Q761.
NG
Failure point
Q761, C763, R766, R767, or R517 is failure.
OK
Next page
Check the voltage waveform at the emitter of Q761.
Failure point
T761 is failure.
NG
Failure point
Q761, C764, R762, R765, R763, D761, or C762 is failure.
OK

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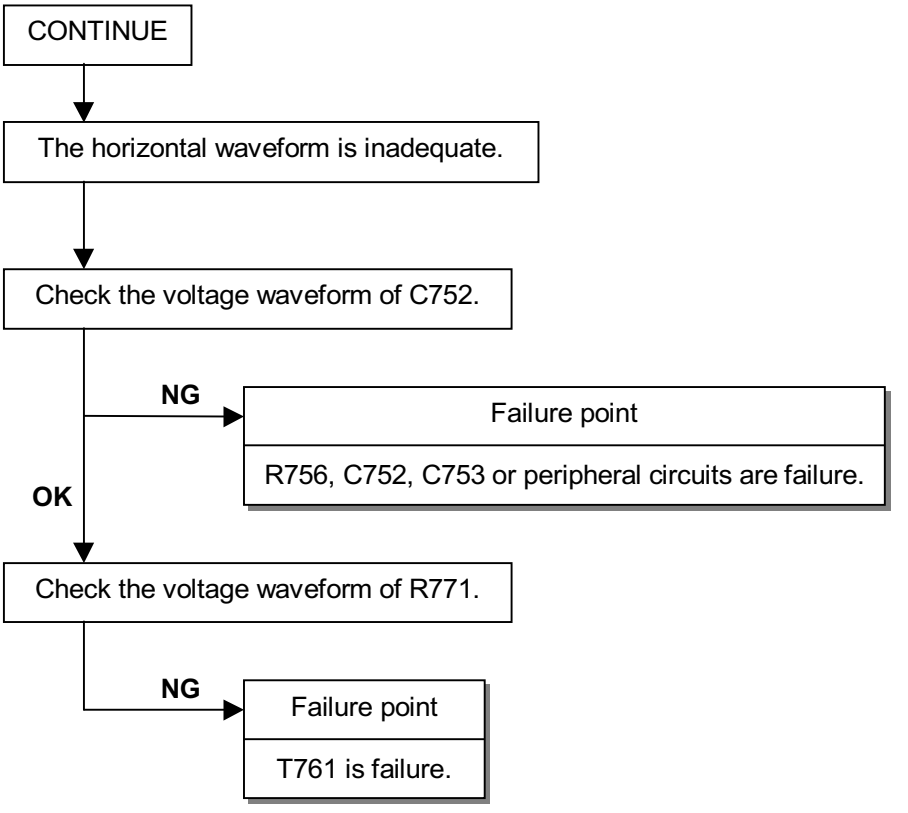

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3. Functional errors

3-1. OSD failure

Note: See Item 2 if a screen is not available even though a video signal input is entered.

Check the OSD signal output.

Check voltages at Pins 12, 13, 15, and 17 of IC291 on the CRT PWB while the EXIT, CONTROL, or PROCEED switch is pressed. (Approx. 5Vp-p)

Horizontal period
Pin 12

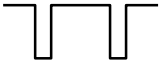
Horizontal period
Pin 13,15,17

OK → Failure point: IC211, R291, R292R, R292G, or R292B on the CRT PWB is failure.

NG ↓

Check the horizontal sync input of IC291.

Check the voltage waveform at Pin 18 of IC291 on the CRT PWB. (Approx. 5Vp-p)



Horizontal period

NG → Failure point: Q791 on the CN-B, CRT PWB or the AFC-TTL line is failure.

OK ↓

Check the vertical sync input of IC291.

Check the voltage waveform at Pin 19 of IC291 on the CRT PWB. (Approx. 5Vp-p)

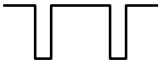
Vertical sync

NG → Failure point: Pin 32 of IC100 is failure.

OK ↓

Check the OSD control line (I^2C).

Check the voltage waveform at Pins 5 and 6 of IC291 on the CRT PWB. (Approx. 5Vp-p)



OK → Failure point: IC291 on the CRT PWB is failure.

NG ↓

Check the user control on the MAIN PWB.

User control on the MAIN PWB The key voltage table for Pins 22 and 23 of IC100 is as shown below.

OK → Failure point: IC100 on the MAIN PWB is failure.

NG → Failure point: SW1X1 to SW1X8 on the MAIN PWB are failure. Otherwise, R1X1 to R1X6 are failure.

Voltages at Pins 22 and 23 of IC100 for key operation

Pin No./Terminal name	23pin/KEY1	22pin/KEY2
FPM (SW1X1) ON	0V	5V
◀ (SW1X3) ON	1.25V	5V
▶ (SW1X4) ON	5V	1.25V
▼ (SW1X5) ON	2.5V	5V
▲ (SW1X6) ON	5V	2.5V
– (SW1X7) ON	3.75V	5V
+ (SW1X8) ON	5V	3.75V

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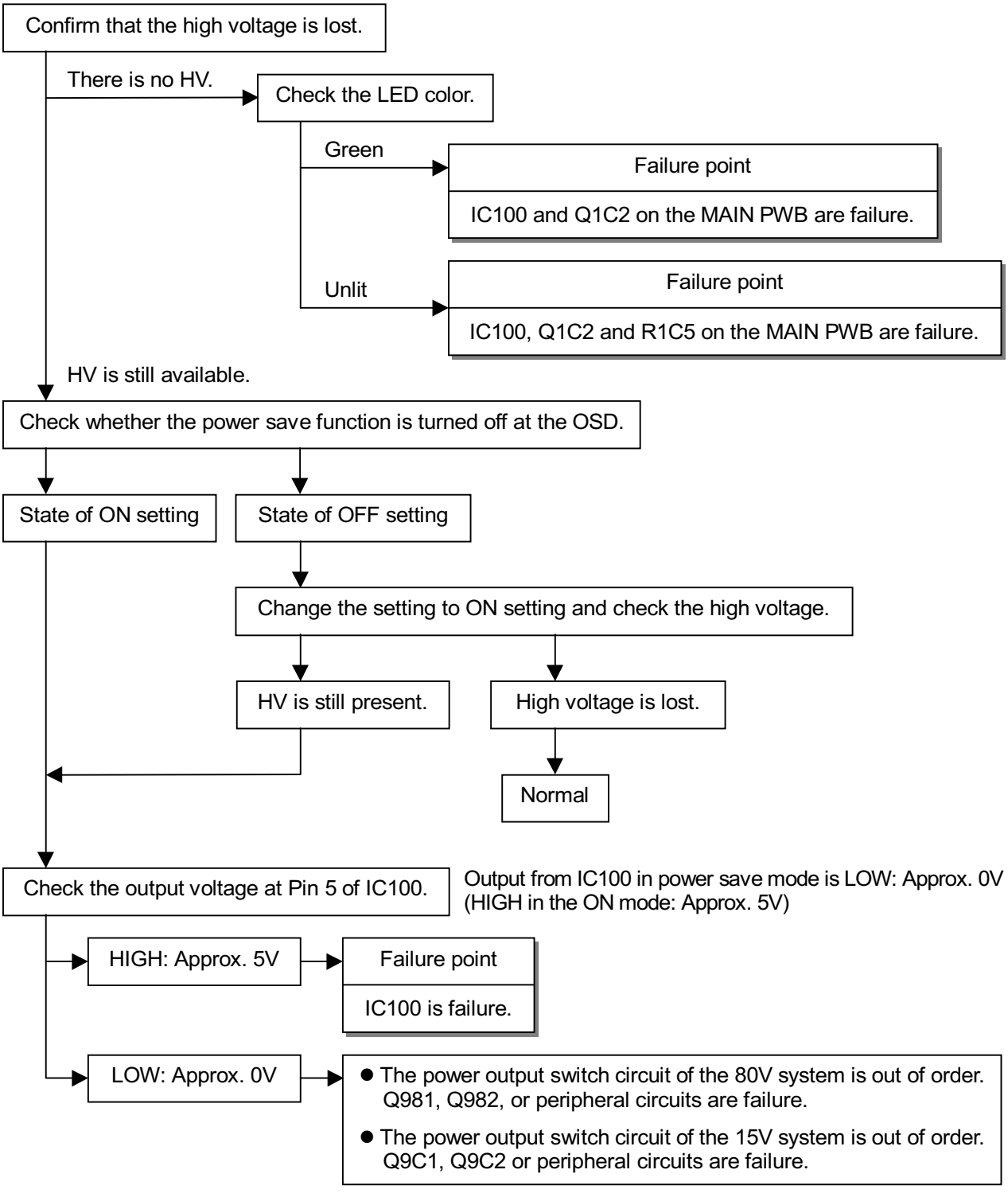
3-2. Power management functional operation error

First of all, disconnect the signal cables from the signal source.

(If a signal input is removed, the high voltage (HV) is generally lost and the LED is turned orange.)


Confirm that the high voltage is lost.
There is no HV.
Check the LED color.
Green
Failure point
IC100 and Q1C2 on the MAIN PWB are failure.
Unlit
Failure point
IC100, Q1C2 and R1C5 on the MAIN PWB are failure.
HV is still available.
Check whether the power save function is turned off at the OSD.
State of ON setting
State of OFF setting
Change the setting to ON setting and check the high voltage.
HV is still present.
High voltage is lost.
Normal
Check the output voltage at Pin 5 of IC100.
Output from IC100 in power save mode is LOW: Approx. 0V
(HIGH in the ON mode: Approx. 5V)
HIGH: Approx. 5V
Failure point
IC100 is failure.
LOW: Approx. 0V
● The power output switch circuit of the 80V system is out of order.
Q981, Q982, or peripheral circuits are failure.
● The power output switch circuit of the 15V system is out of order.
Q9C1, Q9C2 or peripheral circuits are failure.

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3-3. Plug & play operation error

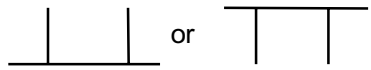
3-3-1. DDC1 output error

Turn off and on the POWER switches of the monitor and the PC. Then, try to maintain DDC1 communication once more again.

OK → Normal

NG → Check the condition of vertical sync.

Check the voltage waveform at Pin 33 of IC100 on the MAIN PWB. Approx. 5Vp-p



NG → Failure point: Q16E on the MAIN PWB is failure.

OK → Check the SDA line.

Check the voltage waveform at Pin 8 of IC100 on the MAIN PWB. Approx. 5Vp-p

0V → Failure point: D206 on the CRT PWB or IC100 on the MAIN PWB is failure.

5V → Failure point: IC100 on the MAIN PWB is failure.

OK → Failure point: The signal cables are failure.

3-3-2. DDC2B output error

Check the SCL line.

Check the voltage waveform at Pin 11 of IC100 on the CRT PWB. (Approx. 5Vp-p)

NG → Check voltages.

Check the voltage at Pin 11 of IC100 on the CRT PWB.

Approx. 0V → Failure point: D205 on the CRT PWB is failure.

Approx. 5V → DDC1 communication is maintained.

OK → Failure point: IC100, D206 on the CRT PWB or the signal cables are failure.

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3-4. Degaussing functional operation error

Check the connections of CN-9Z1 on the MAIN PWB.

NG → Make checking with the CN-9Z1 connected.

OK ↓

Check the degaussing control line.

Confirm that the potential at Pin 35 of IC100 on the MAIN PWB is turned to be at the HIGH level for about 4 seconds when manual degaussing is carried out at the OSD

NG → Failure point: IC100 on the MAIN PWB is failure.

OK → Failure point: The degaussing coil or RP9Z1, RY9Z1, D9Z1, Q9Z1, R9Z1, R9Z2, R9Z3 are failure.

3-5. Key operation error

Check voltages with operation keys.

Confirm that the voltages at Pins 22 and 23 of IC100 on the MAIN PWB are as specified in the table below when the operation key is pressed.

Voltages at Pins 22 and 23 of IC100 during key operation

Pin No./Terminal name	23pin/KEY1	22pin/KEY2
FPM (SW1X1) ON	0V	5V
◀ (SW1X3) ON	1.25V	5V
▶ (SW1X4) ON	5V	1.25V
▼ (SW1X5) ON	2.5V	5V
▲ (SW1X6) ON	5V	2.5V
– (SW1X7) ON	3.75V	5V
+ (SW1X8) ON	5V	3.75V

NG → Failure point: SW1X1 to SW1X8, R1X1 to R1X6 or peripheral circuits are failure.

OK ↓

MPU operation error (See Item 4-7.)

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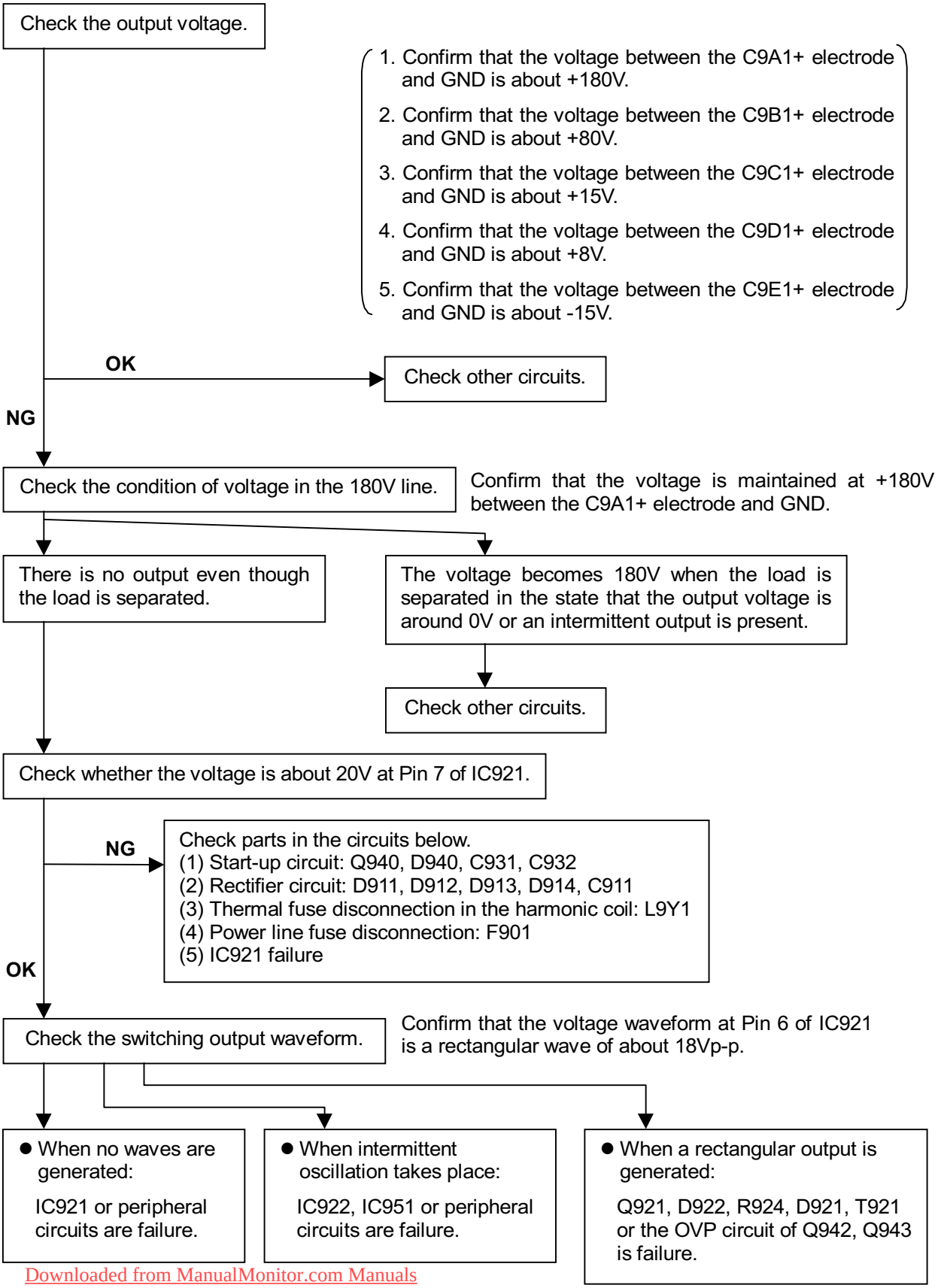
4. Circuit errors

4-1. Power circuit failure

4-1-1. Switching operation error


Check the output voltage.
1. Confirm that the voltage between the C9A1+ electrode and GND is about +180V.
2. Confirm that the voltage between the C9B1+ electrode and GND is about +80V.
3. Confirm that the voltage between the C9C1+ electrode and GND is about +15V.
4. Confirm that the voltage between the C9D1+ electrode and GND is about +8V.
5. Confirm that the voltage between the C9E1+ electrode and GND is about -15V.
OK
Check other circuits.
NG
Check the condition of voltage in the 180V line.
Confirm that the voltage is maintained at +180V between the C9A1+ electrode and GND.
There is no output even though the load is separated.
The voltage becomes 180V when the load is separated in the state that the output voltage is around 0V or an intermittent output is present.
Check other circuits.
Check whether the voltage is about 20V at Pin 7 of IC921.
NG
Check parts in the circuits below.
(1) Start-up circuit: Q940, D940, C931, C932
(2) Rectifier circuit: D911, D912, D913, D914, C911
(3) Thermal fuse disconnection in the harmonic coil: L9Y1
(4) Power line fuse disconnection: F901
(5) IC921 failure
OK
Check the switching output waveform.
Confirm that the voltage waveform at Pin 6 of IC921 is a rectangular wave of about 18Vp-p.
● When no waves are generated:
IC921 or peripheral circuits are failure.
● When intermittent oscillation takes place:
IC922, IC951 or peripheral circuits are failure.
● When a rectangular output is generated:
Q921, D922, R924, D921, T921 or the OVP circuit of Q942, Q943 is failure.

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4-1-2. Power OSC frequency error

Check whether the operating frequency of the power block is identical with that of the deflection circuit. (Check it with the voltage waveform of R9C1.)

NG

Is there input (trigger pulse from the FBT) from CN904? (Measure it at the C926 of the CN904.)

NG

Failure point
CN904 (FBT trigger pulse line) or the HV circuit is failure.

OK

Failure point
D924, R934, R935, C927 or IC921 of control IC is failure.

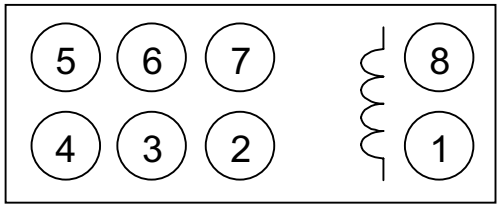
*The self-oscillation frequency of the power circuit is about 25kHz when the deflection/HV circuit is in the state of non-operation. In the state of operation, however, this deflection/HV circuit is designed so that it is synchronized with the deflection frequency.

4-1-3. Harmonic coil changeover circuit error

Check operation of the RY9Y1 relay.

Information about the input source voltages and relay operation is given in the table below.

Diagram of relay terminal numbers on the PWB soldered surface



AC100 ~ 120V	Short-circuited between (2) and (3). Short-circuited between (6) and (7).
AC220 ~ 240V	Short-circuited between (4) and (3). Short-circuited between (5) and (6).

NG

Failure point
Q9Y1, Q9Y2, Q9Y3, D9Y3, D9Y4, or RY9Y1 is failure.

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4-2. Horizontal OSC/ deflection circuit failure

(Prior to following this item, confirm Item 1 and Item 2-3-1.)

Check the 180V line.

Check the L5G1 voltage on the MAIN PWB.

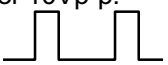
NG → Check the 180V line again after L5G1 has been removed.

OK → Failure point: Q561, Q5G1 or peripheral circuits are failure on the MAIN PWB.

NG → Failure point: The switching power circuit is failure. (See Item 4-1.)

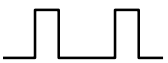
OK → Check the horizontal drive pulses.

Measure the drive pulse voltage (at the base of Q551) on the MAIN PWB, and confirm that there is a rectangular output of 10Vp-p.



OK → Check the drive pulses.

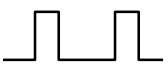
Measure the emitter voltage of Q551 on the MAIN PWB, and confirm that there is a rectangular output of 40Vp-p.



NG → Failure point: Q551, D551 or peripheral circuits are failure on the MAIN PWB.

OK → Check the voltage waveform at the base of Q561.

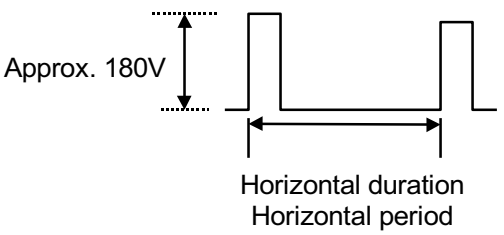
Measure the voltage waveform at the base of Q561 on the MAIN PWB, and confirm that there is a rectangular output of about 10Vp-p.



NG → Failure point: Q561, T551, D561, D562 on the MAIN PWB or peripheral circuits are failure.

OK → Check the drain waveform of Q5G1.

Measure the drain voltage waveform of Q5G1 on the MAIN PWB, and confirm that there is a waveform output as shown below.



NG → Failure point: Q5G1, D581, R5G1, R5G2, C5G2, D5G2 on the MAIN PWB or peripheral circuits are failure.

OK → Next page

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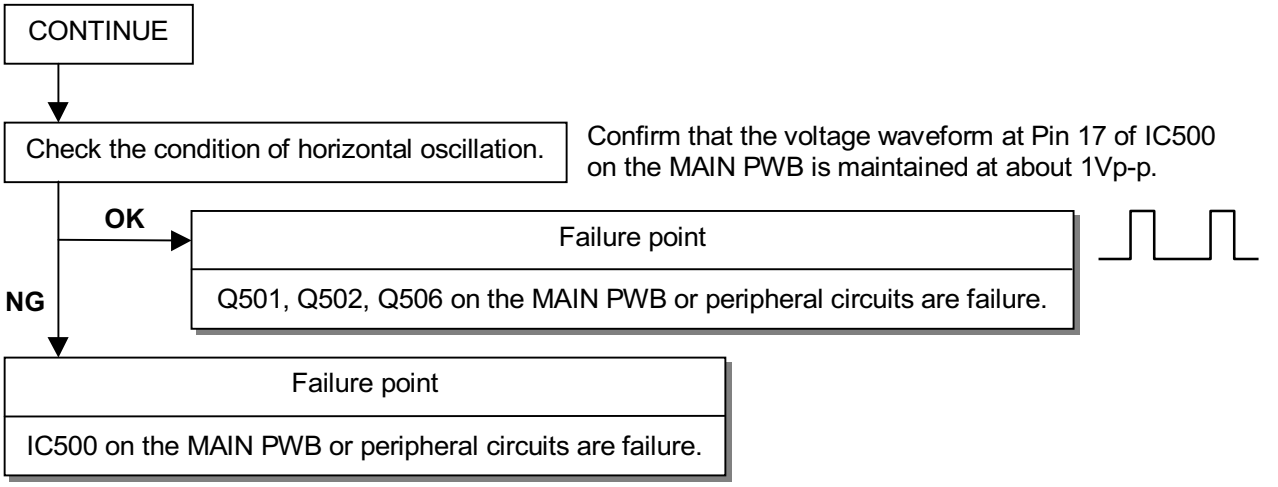
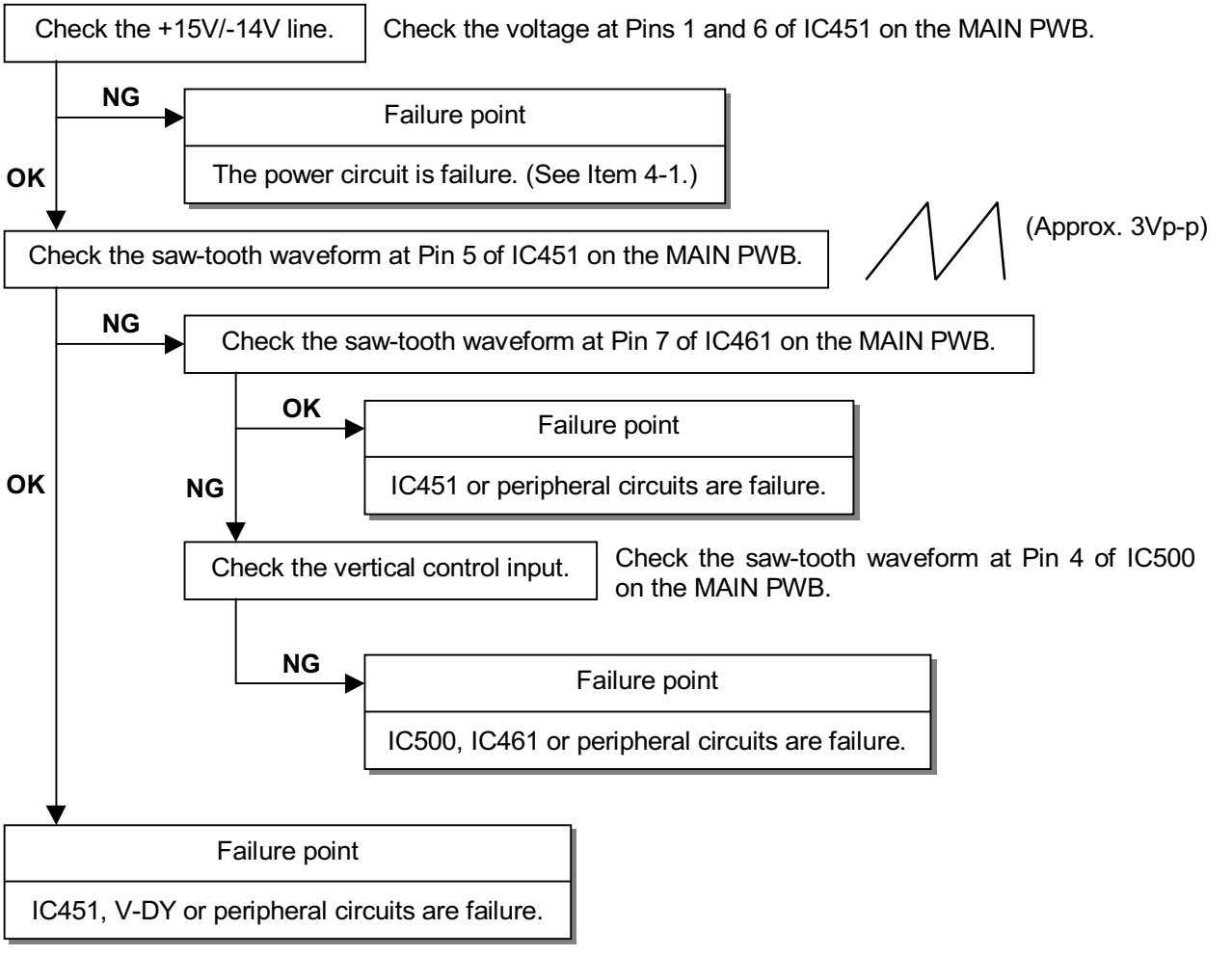

CONTINUE
Check the condition of horizontal oscillation.
Confirm that the voltage waveform at Pin 17 of IC500 on the MAIN PWB is maintained at about 1Vp-p.
OK
Failure point
Q501, Q502, Q506 on the MAIN PWB or peripheral circuits are failure.
NG
Failure point
IC500 on the MAIN PWB or peripheral circuits are failure.

4-3. Vertical OSC/ deflection circuit failure

(Prior to following this item, confirm Item 2-3-2.)


Check the +15V/-14V line.
Check the voltage at Pins 1 and 6 of IC451 on the MAIN PWB.
NG
Failure point
The power circuit is failure. (See Item 4-1.)
OK
Check the saw-tooth waveform at Pin 5 of IC451 on the MAIN PWB.
(Approx. 3Vp-p)
NG
Check the saw-tooth waveform at Pin 7 of IC461 on the MAIN PWB.
OK
Failure point
IC451 or peripheral circuits are failure.
NG
OK
Check the vertical control input.
Check the saw-tooth waveform at Pin 4 of IC500 on the MAIN PWB.
NG
Failure point
IC500, IC461 or peripheral circuits are failure.
Failure point
IC451, V-DY or peripheral circuits are failure.

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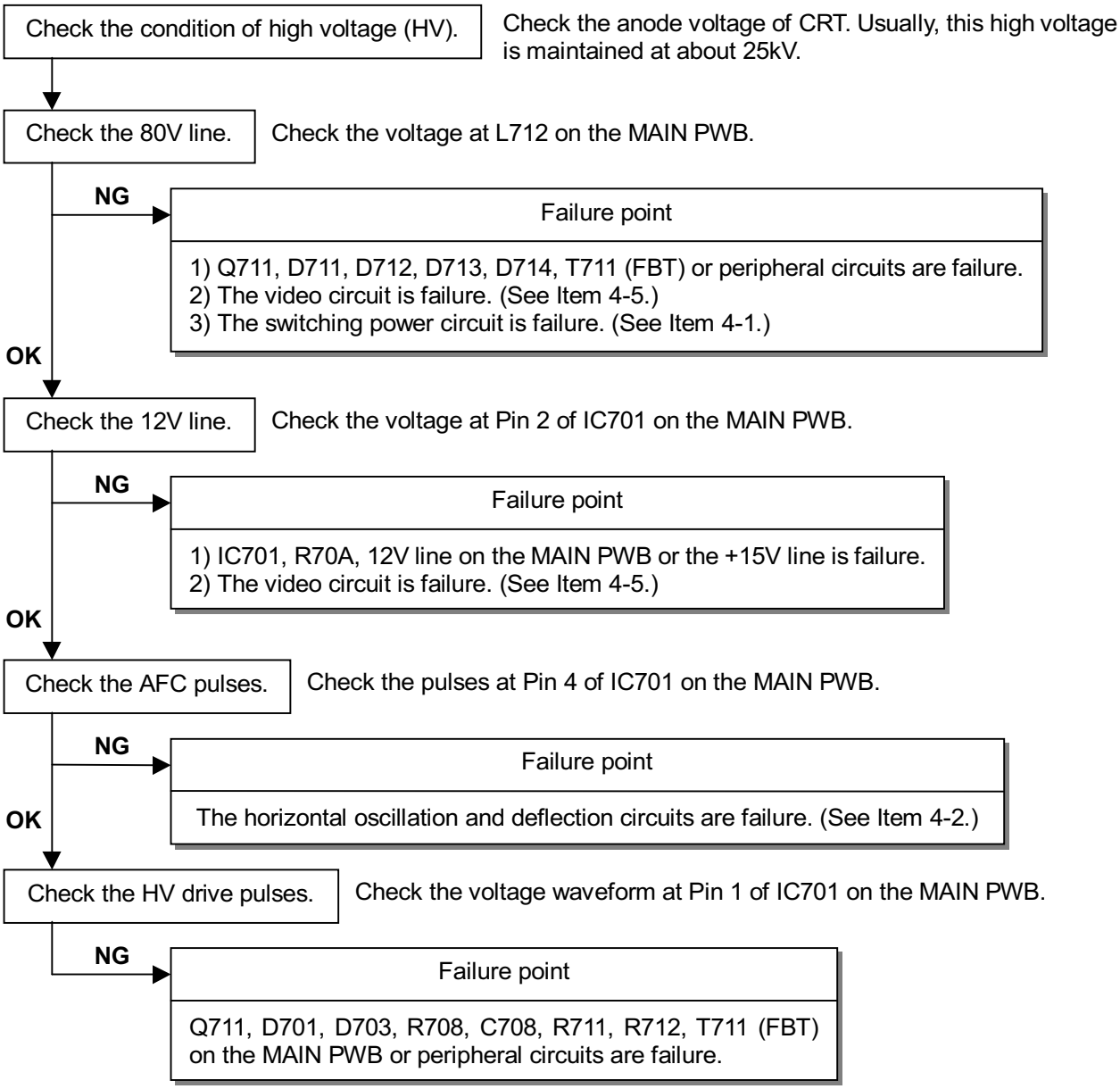
4-4. HV circuit failure

(Check Item 1 before this item.)


Check the condition of high voltage (HV).
Check the anode voltage of CRT. Usually, this high voltage is maintained at about 25kV.
Check the 80V line.
Check the voltage at L712 on the MAIN PWB.
NG
Failure point
1) Q711, D711, D712, D713, D714, T711 (FBT) or peripheral circuits are failure.
2) The video circuit is failure. (See Item 4-5.)
3) The switching power circuit is failure. (See Item 4-1.)
OK
Check the 12V line.
Check the voltage at Pin 2 of IC701 on the MAIN PWB.
NG
Failure point
1) IC701, R70A, 12V line on the MAIN PWB or the +15V line is failure.
2) The video circuit is failure. (See Item 4-5.)
OK
Check the AFC pulses.
Check the pulses at Pin 4 of IC701 on the MAIN PWB.
NG
Failure point
The horizontal oscillation and deflection circuits are failure. (See Item 4-2.)
OK
Check the HV drive pulses.
Check the voltage waveform at Pin 1 of IC701 on the MAIN PWB.
NG
Failure point
Q711, D701, D703, R708, C708, R711, R712, T711 (FBT) on the MAIN PWB or peripheral circuits are failure.

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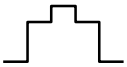
4-5. Video circuit failure

(Check Item 2-2 before this item.)

Check the R,G,B video outputs.

Measure the waveforms at R2C1R, R2C1G, R2C1B on the CRT PWB in the all white pattern mode.

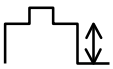


NG → Check the 80V line.

Measure the voltage between GND and Pin 6 of IC221 on the CRT PWB.

NG → Failure point

1) CN902, IC221 or peripheral circuits are failure.
2) The power circuit is failure. (See Item 4-1.)



OK

Check the output waveform of the output IC.

Check the waveforms at Pins 1, 3, and 5 of IC721 on the CRT PWB. (Approx. 42Vp-p)

OK → Failure point

Anyone of C241R/G/B, L221R/G/B, R2C1R/G/B on the CRT PWB or the CRT socket is failure.

NG

Check the 12V line.

Measure the voltage between GND and Pin 2 of CN-902.

NG → Failure point

IC211, IC221, C213, C224, IC271 or the 12V regulator circuit IC9G1 of the power circuit is failure.

OK

Check the input waveform of the output IC.

Check the waveforms at Pins 8, 9, and 11 of IC721 on the VIDEO PWB. (Approx. 2.8Vp-p)

OK → Failure point

IC221 on the CRT PWB is failure.

NG

Check the input waveform of the pre-AMP.

Check the waveforms at Pins 2, 6, and 11 of IC211 on the CRT PWB. (Approx. 0.7Vp-p)

NG → Failure point

R211R/G/B, C201R/G/B or the signal cables are failure.

OK

Check the blanking signal.

Check the waveform at Pin 27 of IC211 on the CRT PWB. Confirm that the blanking waveform is maintained at about 5Vp-p.

NG → Failure point

CN-101 or IC100 on the MAIN PWB is failure.

OK

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Next page 1

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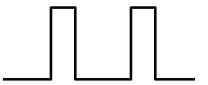
CONTINUE 1

CONTINUE 2

Check the clamp waveform.

Check the waveform at Pin 19 of IC211 on the CRT PWB. Confirm that the blanking waveform is maintained at about 5Vp-p.



OK

NG

Failure point

IC500 on the MAIN PWB or CN-101 is failure.

OK

Check the output waveform of the pre-AMP.

Check the waveforms at Pins 35, 29, and 32 of IC211: R/G/B output on the CRT PWB.

NG

Failure point

IC211 on the CRT PWB is failure.

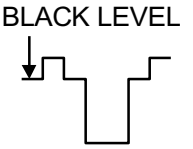
OK

Failure point

R221R/G/B is failure.

Check the R,G,B video outputs.

Check the voltage waveform at R2C1R/G/B on the CRT PWB, and confirm that the voltage value of BLACK LEVEL is maintained at about 80 to 150V.



NG

Check the 180V line.

Measure the voltage between the + electrode of C9A2 and GND.

NG

Failure point

CN902 or the 180V line of the power circuit is failure.

OK

OK

Measure the voltage between the + electrode of C244R/G/B on the CRT PWB and GND.

Confirm that this voltage is maintained at about 90 to 160V.

NG

Confirm that the base voltage of Q241R/G/B is about 6V.

NG

Failure point

R249, D243, R24A or peripheral circuits are failure.

OK

OK

Failure point

Q241R/G/B or Q242R/G/B is failure.

Failure point

L241, L242, or L243 is failure.

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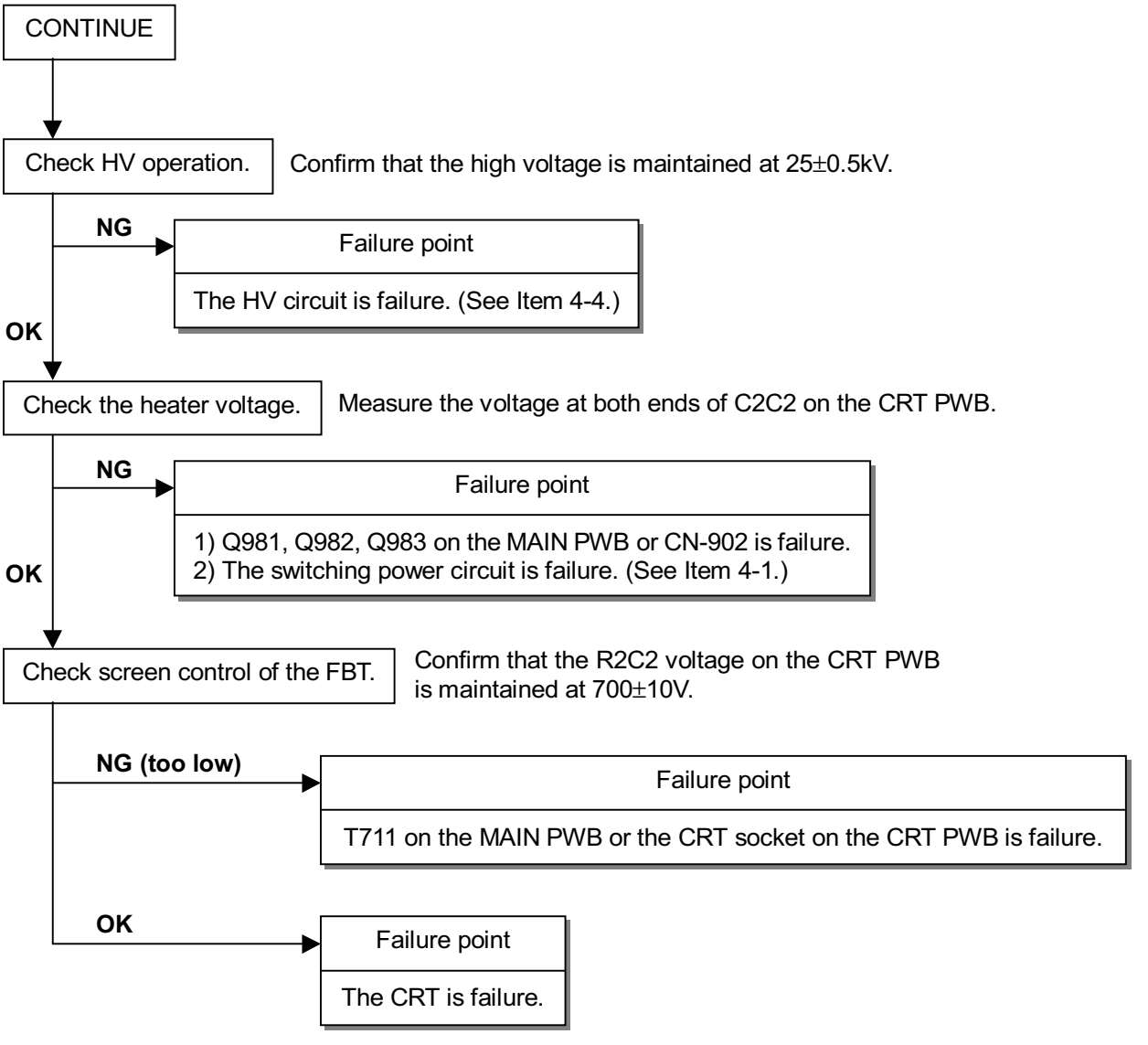
CONTINUE
Check HV operation.
Confirm that the high voltage is maintained at 25±0.5kV.
NG
Failure point
The HV circuit is failure. (See Item 4-4.)
OK
Check the heater voltage.
Measure the voltage at both ends of C2C2 on the CRT PWB.
NG
Failure point
1) Q981, Q982, Q983 on the MAIN PWB or CN-902 is failure.
2) The switching power circuit is failure. (See Item 4-1.)
OK
Check screen control of the FBT.
Confirm that the R2C2 voltage on the CRT PWB is maintained at 700±10V.
NG (too low)
Failure point
T711 on the MAIN PWB or the CRT socket on the CRT PWB is failure.
OK
Failure point
The CRT is failure.

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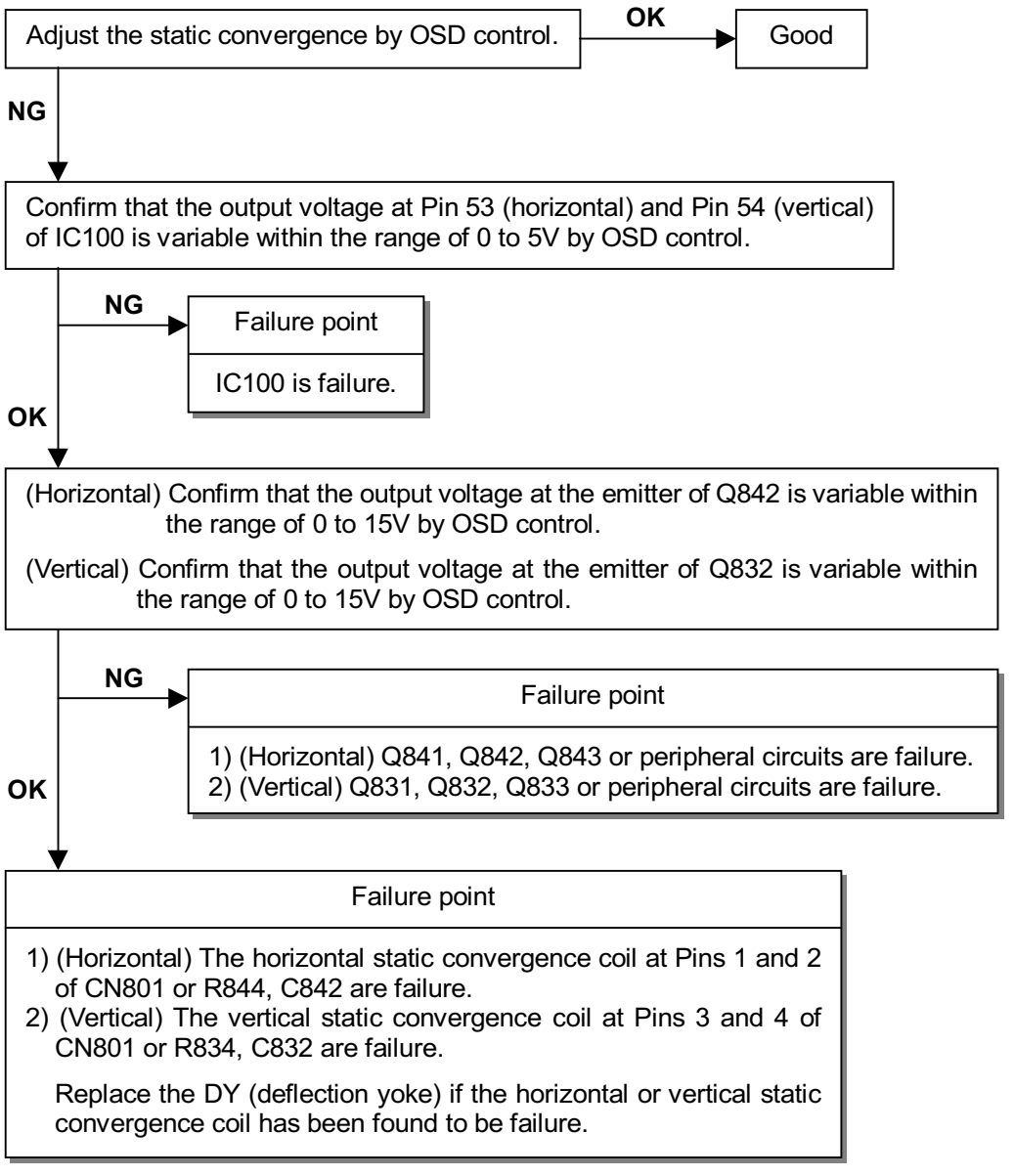
4-6. Static convergence corrector circuit failure

The static convergence circuit consists of the two circuits; the horizontal static convergence circuit and the vertical static convergence circuit.


Adjust the static convergence by OSD control.
OK
Good
NG
Confirm that the output voltage at Pin 53 (horizontal) and Pin 54 (vertical) of IC100 is variable within the range of 0 to 5V by OSD control.
NG
Failure point
IC100 is failure.
OK
(Horizontal) Confirm that the output voltage at the emitter of Q842 is variable within the range of 0 to 15V by OSD control.
(Vertical) Confirm that the output voltage at the emitter of Q832 is variable within the range of 0 to 15V by OSD control.
NG
Failure point
1) (Horizontal) Q841, Q842, Q843 or peripheral circuits are failure.
2) (Vertical) Q831, Q832, Q833 or peripheral circuits are failure.
OK
Failure point
1) (Horizontal) The horizontal static convergence coil at Pins 1 and 2 of CN801 or R844, C842 are failure.
2) (Vertical) The vertical static convergence coil at Pins 3 and 4 of CN801 or R834, C832 are failure.
Replace the DY (deflection yoke) if the horizontal or vertical static convergence coil has been found to be failure.

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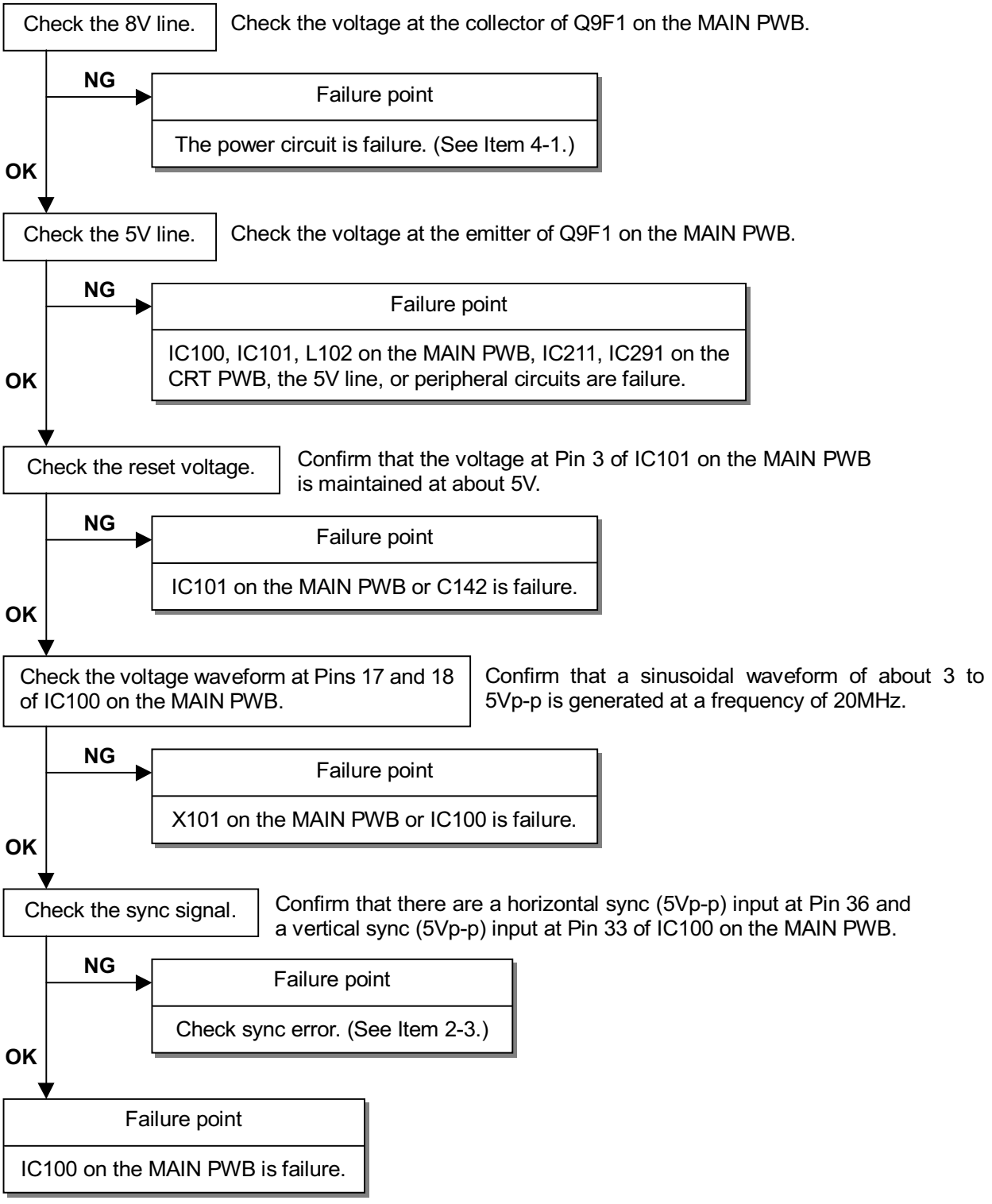
4-7. MPU operation error


Check the 8V line.
Check the voltage at the collector of Q9F1 on the MAIN PWB.
NG
Failure point
The power circuit is failure. (See Item 4-1.)
OK
Check the 5V line.
Check the voltage at the emitter of Q9F1 on the MAIN PWB.
NG
Failure point
IC100, IC101, L102 on the MAIN PWB, IC211, IC291 on the CRT PWB, the 5V line, or peripheral circuits are failure.
OK
Check the reset voltage.
Confirm that the voltage at Pin 3 of IC101 on the MAIN PWB is maintained at about 5V.
NG
Failure point
IC101 on the MAIN PWB or C142 is failure.
OK
Check the voltage waveform at Pins 17 and 18 of IC100 on the MAIN PWB.
Confirm that a sinusoidal waveform of about 3 to 5Vp-p is generated at a frequency of 20MHz.
NG
Failure point
X101 on the MAIN PWB or IC100 is failure.
OK
Check the sync signal.
Confirm that there are a horizontal sync (5Vp-p) input at Pin 36 and a vertical sync (5Vp-p) input at Pin 33 of IC100 on the MAIN PWB.
NG
Failure point
Check sync error. (See Item 2-3.)
OK
Failure point
IC100 on the MAIN PWB is failure.

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4-8. Self-diagnostic functions

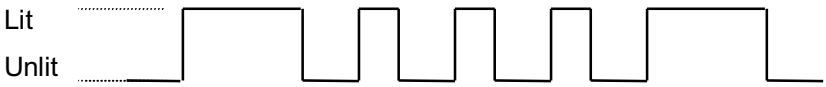
This model is provided with the functions that a circuit error is detected by the MPU and this error is indicated by the LED blinking frequency.

When the protector is in operation, the LED is made to blink as shown below in order to indicate the factor of protector operation.

LED Blinking Patterns for Each Protector Operation (List of Protector Indicators)

Protector condition	LED condition	
	Short (0.5s) lighting frequency	Long (2s) lighting frequency
HV data error	3	1
Deflection circuit stop	4	1
Beam protector	5	1
Heater power error	6	1

(1) How to count the LED lighting frequency [Example: HV data error (3 times)]



2 sec. 0.5 sec. 0.5 sec. 0.5 sec. 2 sec.
Once Twice 3 times
(Frequency: Lighting 3 times)

(2) Diagnostic mode and error circuit

3 times —— HV data error ———— Power OFF/ON and data recovery
4 times —— Deflection circuit stop —— Check Items 4-2 and 4-3.
5 times —— Beam protector ———— Check Item 4-4.
6 times —— Heater power error ———— Check Items 1 and 4-1.

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CIRCUIT DESCRIPTION

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This monitor is composed mainly of the following five circuits and two PWBs:

a) Power circuit (Main PWB)

b) Horizontal and vertical deflection circuit (Main PWB)

c) High voltage circuit (Main PWB)

d) Microcomputer and control circuit (Main PWB)

e) Video circuit (CRT PWB)

f) CRT drive circuit (CRT PWB)

This monitor is provided with the auto-tracking function of the digital control type. It performs the automatic follow-up (auto-tracking) of input signals, ranging from 31 to 96kHz for the horizontal frequencies and 55 to 160Hz for the vertical frequencies.

Through the circuit changeover with the aid of the horizontal frequency, circuit operation is performed in an optimal state. In the control circuit, the input frequency discrimination is carried out to generate a control signal output that matches the input frequency. Control of each IC is effected through the I^2C bus.

1. Power circuit

The maximum power consumption of this monitor is 96W. With the power in the range of 100 to 120V-AC 220V to 240V, 50/60Hz, automatic support is conducted for the monitor.

The power block is composed of the switching regulator by the use of the current mode PWM (pulse width Modulation).

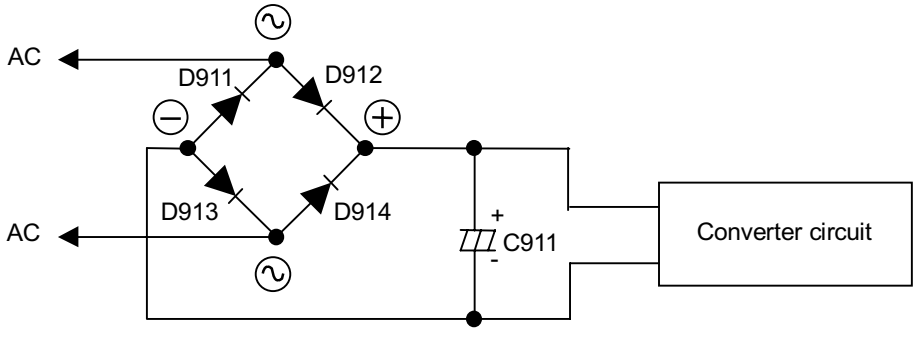
The switching frequency is synchronized with the horizontal frequency and the stabilized output is assured on the secondary side.

The secondary outputs from the POWER block are as specified in the table below.

Output	Major loads
8V	Microcomputer, OSD, heater, rotation, convergence
15V	Vertical deflection, high voltage control, VIDEO pre-AMP, rotation, convergence
-15V	Vertical deflection, horizontal drive
80V	High voltage output, video output circuit
180V	Horizontal deflection, video cutoff circuit

1-1. Rectifier smoothing circuit

The AC input voltage is applied to the diode circuit of the bridge rectifier, consisting of D911, D912, D913, and D914. The rectified voltage is smoothed at C911 and converted into a DC voltage, which is then supplied to the converter circuit.



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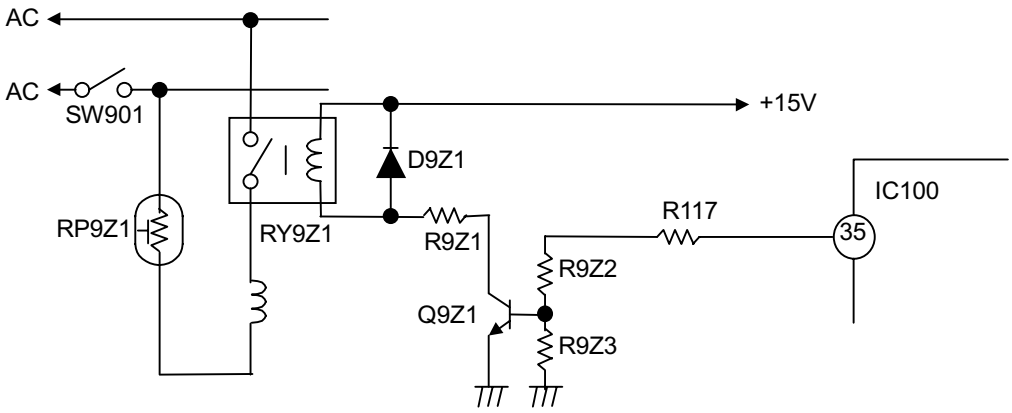
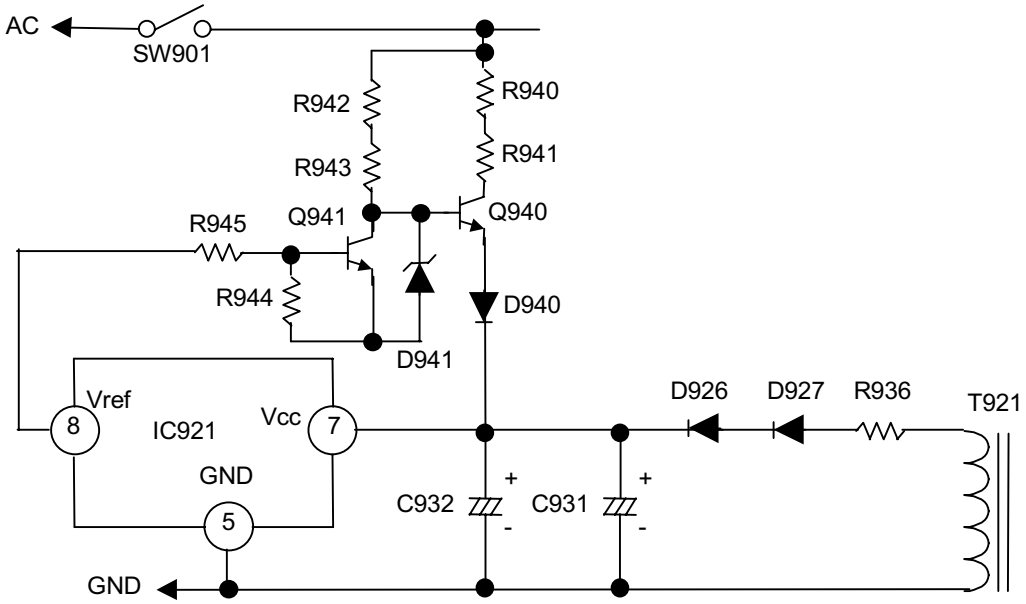
1-2. Demagnetizer circuit

When the POWER switch SW901 of this monitor is turned on or manual degaussing is turned on for the OSD menu, a current from Pin 35 of IC100 begins to flow into the base of Q9Z1. Then, Q9Z1 and RY9Z1 are turned on for about 6 seconds. Due to the effect of self-heat generation in the posistor, the degaussing current decreases gradually and the degaussing operation is automatically carried out.



1-3. Auxiliary power supply circuit

The auxiliary power supply circuit is indispensable for the starting and operation of IC921. When the POWER switch is turned on, a charging current flows into C931 and C932 through R940, R941, and D940. When the voltage at Pin 7 of IC921 attains about 17V with this charging current, the oscillator circuit begins to operate in IC921. Since then, the flyback voltage at the auxiliary winding of T921 is rectified and smoothed by D926, D927, C931, and C932, and the DC voltage is applied to Pin 7 of IC921.



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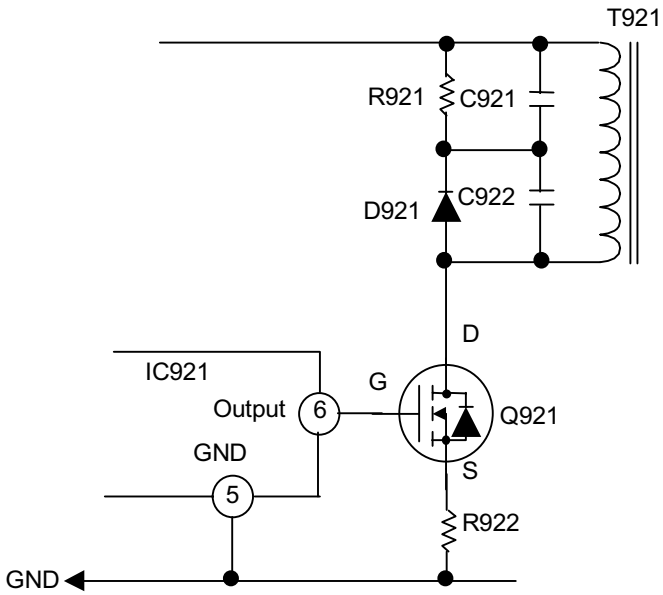
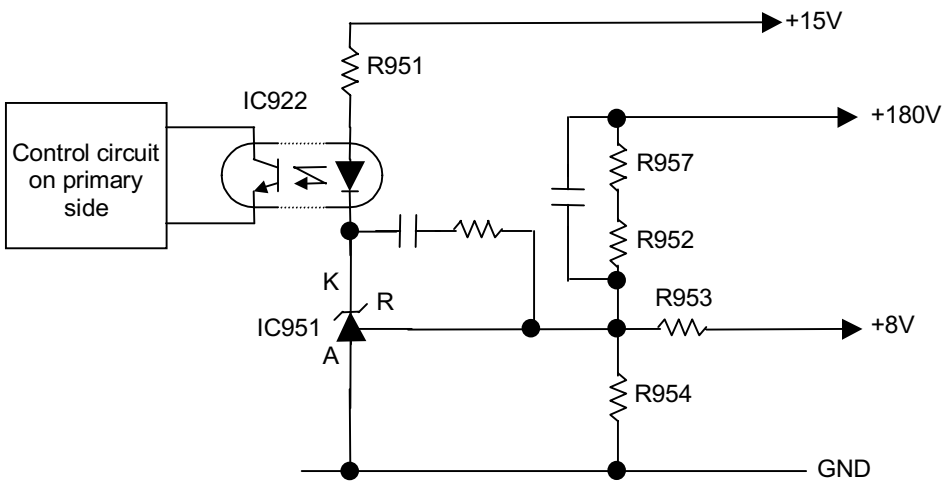
1-4. Converter circuit

The converter circuit is composed of the primary winding of T921, the switching element of Q921, and the snubber circuit (of C921, C922, D921, and R921) that is connected to the primary winding of the T921. When the pulse signal output from Pin 6 of IC921 is applied to the gate circuit of Q921, the section between drain and source is turned on and off in Q921. As a result, the pulse voltage is applied to the primary winding of the T921.



1-5. Error detector and amplifier circuit

The outputs of +180V and +8V are compared with the detected voltages at the shunt regulator IC951. The error signal is fed back to the control circuit on the primary side via IC922. The feedback operation of the secondary side voltage is effected in the two lines of 180V and 8V, for the purposes of 180V stabilization of the cutoff voltage for the video and for the 5V stabilization in the normal mode and during the functional operation for power management.



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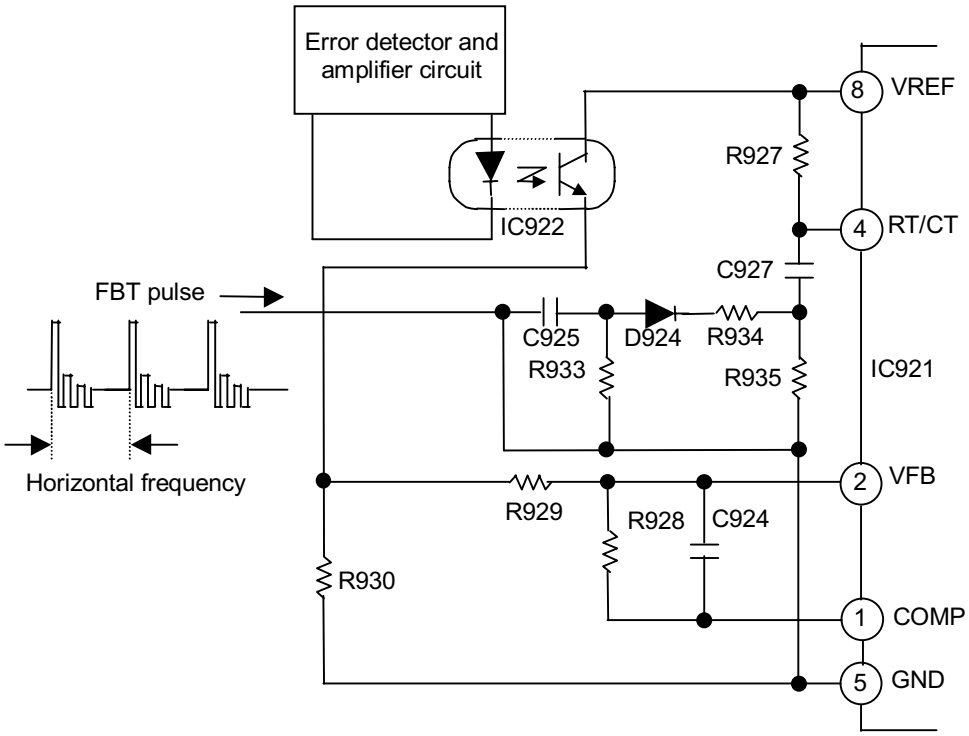
1-6. Oscillator and primary-side control circuit

The oscillator and the primary-side control circuit are incorporated in IC921. The oscillator operates on the basis of the free-run frequency that is dependent on C927 and R927, and the horizontal sync signal that is generated by the FBT pulses.

The output of the error detector and amplifier circuit is fed back to the primary side by IC922 and the input is entered in Pin 2 of IC921. Using the entered data input, IC921 controls the duty period for Q921 and the resultant signal is transmitted to the converter circuit. As a result, the output voltage on the secondary side is maintained at a constant level.



1-7. Power management circuit

This monitor is provided with the power management function. This function is available only if the monitor is connected with a personal computer where the power management function is loaded.

Mode	H-SYNC	V-SYNC	Status	CRT display
Normal	ON	ON	Video display	Video display
Stop mode	OFF ON OFF	ON OFF OFF	No video Reduced voltage at the CRT heater Mode (Approx. 2.0V)	No raster

The power consumption and the indication of POWER lamp in each mode are as specified below.

Mode	Power consumption	LED display
Normal	96W	Green
Stop mode	5W max.	Orange

The control signals intended for the execution of the power management function are output from the microcomputer IC100. These control signals come in the three signals of SUSPEND, HEATEROFF, and BRIGHT together with the respective signals of contrast control through the IIC bus. The operational conditions of the respective signals are as specified in the table below.

Control signal name	PIN of IC100	Normal	Stop
SUSPEND	5pin	H	L
HEATER OFF	42pin	PWM	PWM
BRIGHT	C126+ side	Approx. 2.5V	H

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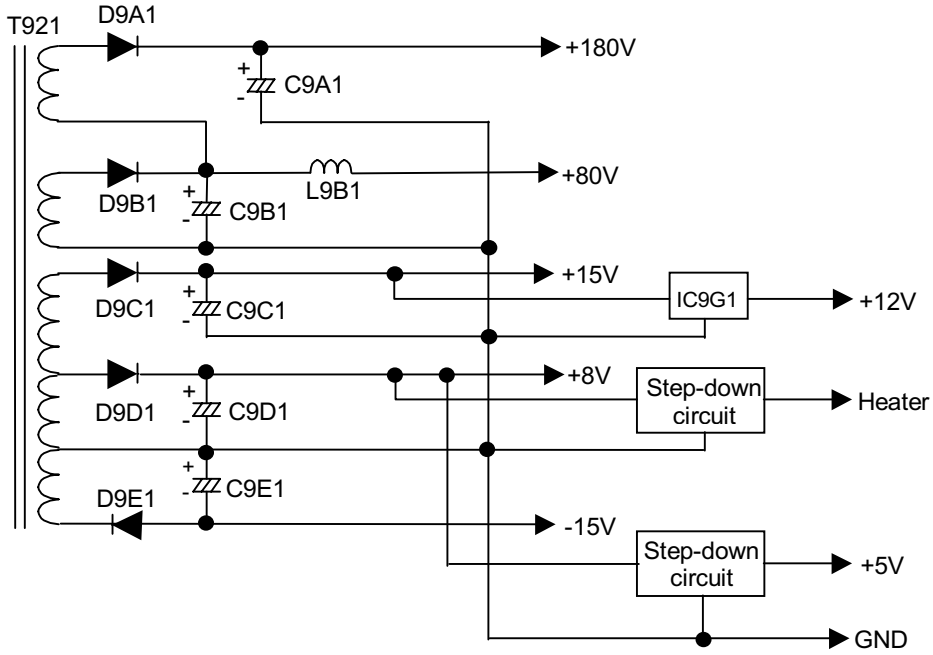
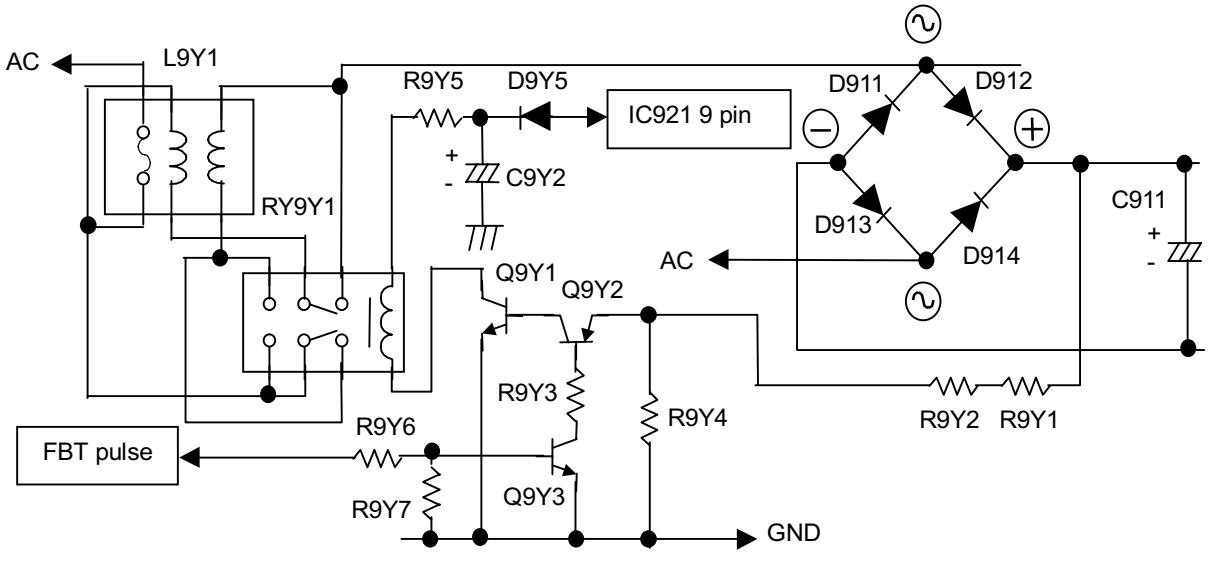
1-8. Secondary rectifier and smoothing circuit

The power output line on the secondary side is provided with a half-wave rectifier circuit. The flyback voltage generated in the secondary winding of T921 is rectified at D9A1, D9B1, D9C1, D9D1, and D9E1. The rectified voltage is smoothed at C9A1, C9B1, C9C1, C9D1, and C9E1, and a DC voltage is obtained. The DC voltage is maintained at a constant level by controlling the ON period of Q921 in the converter circuit.



1-9. POWER harmonic suppressor circuit

This monitor is provided with a POWER harmonic suppressor circuit that is available for worldwide AC inputs. In this system, a choke coil is connected to the AC line. The charging current into C911 is limited by an impedance component of the choke coil and the harmonic current is suppressed by spreading the conducting angle. When the voltage stays within the range of AC100V to 120V, the inductance is lowered and the current density is decreased by making a parallel connection of RY9Y1 with a coil in L9Y1. If the voltage is within the range of AC220V to 240V, the inductance is raised and the current density is increased by making a series connection of RY9Y1 with the coil in L9Y1. As a result, the inductance is set at a value suitable for the AC input. While the power management function is effective, the operating voltage of RY9Y1 is cut off to suppress the power consumption, by turning off Q9Y3 in synchronization with the FBT pulses.



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2. HV deflection circuit

2-1. Horizontal deflection (IC500)

IC500 is in charge of the horizontal width control and the generation of vertical pre-AMP output. This IC performs automatic frequency follow-up operation to generate a proper output of horizontal drive pulses. For the control of screen size also, the output of B+ drive pulses is also generated.

In addition, the parallelogram distortion, pin balance, and the horizontal position are controlled with the control signal from the microcomputer of IC100.

The horizontal and vertical parabolic waveform outputs for focusing are also generated.

The pre-AMP functions are available for vertical screen width, position, and vertical linearity.

2-2. Step-down type horizontal deflection power circuit

During the time period when Q5G1 is turned on with the B+ driver pulse that has been output from Pin 14 of IC500, the energy from the 180V line is stored in T561. During the time period when Q5G1 is turned off, the stored energy is discharged and integrated by this T561 and the Character S compensation capacitor.

The duty rate of this B+ driver pulse is determined by the horizontal width control circuit.

2-3. Horizontal width control circuit

Q561 is controlled by the horizontal drive pulse that is sent from IC500. While this Q561 is turned on, the energy is stored in the horizontal deflection yoke. While it is turned off, the energy flows into C561. The horizontal deflection is effected through the repetition of this operation. The collector pulse of Q561 is voltage-divided by the capacitors C562 and C563. The resultant pulses are used for the synchronization of switching at the high voltage control IC701 and the generation of horizontal blanking pulses.

The horizontal width is controlled by changing the duty rate of the B+ drive pulse that has been output from Pin 14 of IC500. When the duty rate is changed, the rectifying voltage for D5G2 and the Character S compensation capacitor is changed. Then, the horizontal width is also changed. The vertical parabolic waveform is generated inside the IC500 and its output is generated from Pin 5 of IC500. This output is applied to the B+ drive pulse generator circuit through R518. With this parabolic output, various controls are carried out for the compensation for the bobbin distortion, barrel distortion, trapezoid distortion, top corner distortion, and bottom corner distortion.

2-4. High voltage circuit

The high voltage circuit uses the ON/OFF time PWM control system for the high voltage generating circuit. IC701 is used as the PWM control IC. The pulse voltage generated at Q711 is stepped up at T711 (F.B.T) that generates a high voltage of 25kV. The feedback voltage is obtained from Pin 11 of T711, and is added to the voltage that has been gained from a control voltage at Pin 55 of the microcomputer through the voltage division at the resistors R704 and R705. The voltage sum is fed back to Pin 12 of IC701 to control the pulse width of the PWM output at Pin 1. In this manner, a high voltage is maintained at a constant level. PWM is synchronized with the horizontal sync frequency. The trigger pulse for synchronization is obtained from the horizontal deflection output transistor Q561 through voltage division of the Q561 collector pulses. The output pulse is entered in Pin 3 of IC701. In the high voltage circuit of this PWM system, unlike the B+ control system, the waveform at Pin 1 of T711 continues to maintain the resonance waveform until the FET is turned on after the placement of a retrace pulse.

After the adjustment of high voltage, the voltage is controlled at Pin 55 of IC100.

2-5. Dynamic focusing circuit

The primary winding of T751 is driven by the parabolic voltage that is generated at the both ends of the Character S compensation capacitors C573 and C574. As a result, the secondary winding of T751 generates a horizontal parabolic wave stepped up to about 5.5 times. On the other hand, an output of the vertical parabolic waves is generated from Pin 9 of IC500, and amplified at Q761. Since then, the amplified output is superposed on the vertical parabolic waves on the secondary side of T751. For the power supply for Q761, the collector pulse voltage is utilized from the transistor (Q711) of the HV output rectified at D761 and C762.

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2-6. Safety protection and X-ray protection circuits

2-6-1. X-ray protection circuit

This is a protection circuit to avoid the condition that the X-ray radiation exceeds a specified dangerous level due to the abnormal rise of high voltage.

The high voltage circuit and the safety protection circuit must not be modified.

The upper limit high voltage value and the beam current value are determined based on the upper limit curve of the CRT X-ray radiation.

The X-ray protection circuit operates at 28kV. The pulse voltage rise at Pin 6 of T711 is rectified at D741 and C741, and the rectified voltage is detected at Pin 9 of IC701. When the specified voltage is exceeded, the supply of high voltage FET drive pulse output is suspended at Pin 1 and the generation of high voltage is stopped. In this fashion, the X-ray protection is effective.

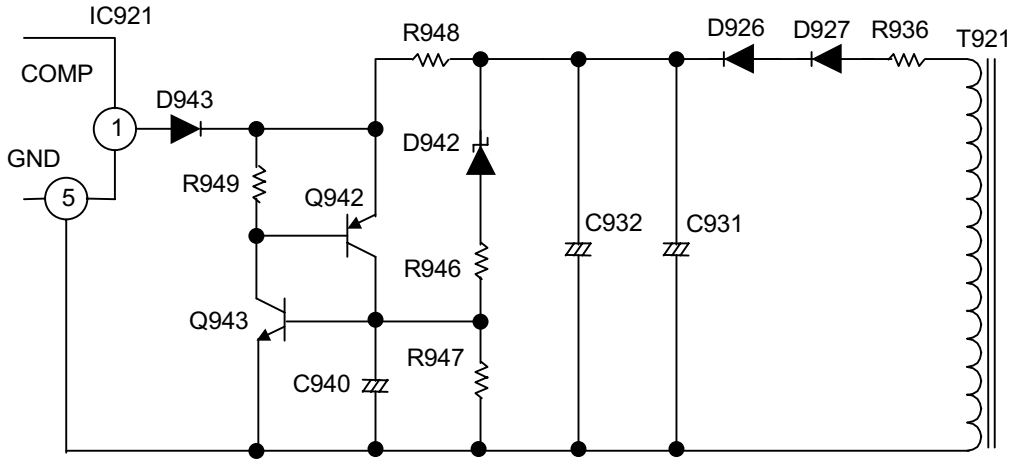
This circuit operation is sustained until the AC power circuit is turned off.

2-6-2. Beam current protection circuit

This protection circuit begins to function when the incoming current in the high voltage generator windings of the FBT exceeds 1.7mA. The detection of the beam current is carried out by sensing the voltage drop at R731 and R737 connected to the section between 12V and Pin 9 of T711. When the incoming current to Pin 9 exceeds 1.7mA, the voltage at Pin 9 of T711 is lowered. Then D731 is turned ON and Q731 is also turned ON. Then, the collector voltage at Q731 is turned high (H) and the potential at Pin 10 of IC100 is turned high. At this stage, high voltage deflection stops and the complete stop mode is assumed. If the horizontal frequency is low, the overcurrent protection circuit of IC701 operates first, prior to the operation of the above-mentioned overcurrent protection circuit. With an increase in the beam current, the peak voltage increases in the section between DRAIN and SOURCE of Q711. This current is converted into a voltage at R712 and the converted voltage is detected at Pin 6 of IC701. When the voltage exceeds the specified level, the supply of high voltage drive pulses is suspended at Pin 1 of IC701, and the generation of a high voltage is stopped as a result. Also in this case, the foregoing stoppage of high voltage is sensed by IC100 and the complete stop mode is assumed.

2-6-3. Power line overvoltage protection circuit

When the winding voltage is raised on the secondary side of T921 on account of a certain abnormal condition, the winding voltage for the auxiliary power source of T921 is also increased in proportion to the turn ratio. If the voltage at both ends of C932 exceeds the zener voltage of D942, both Q942 and Q943 are then turned on. As a result of this operation, the voltage at Pin 1 of IC921 lowers and operation of the oscillator within IC921 is suspended.



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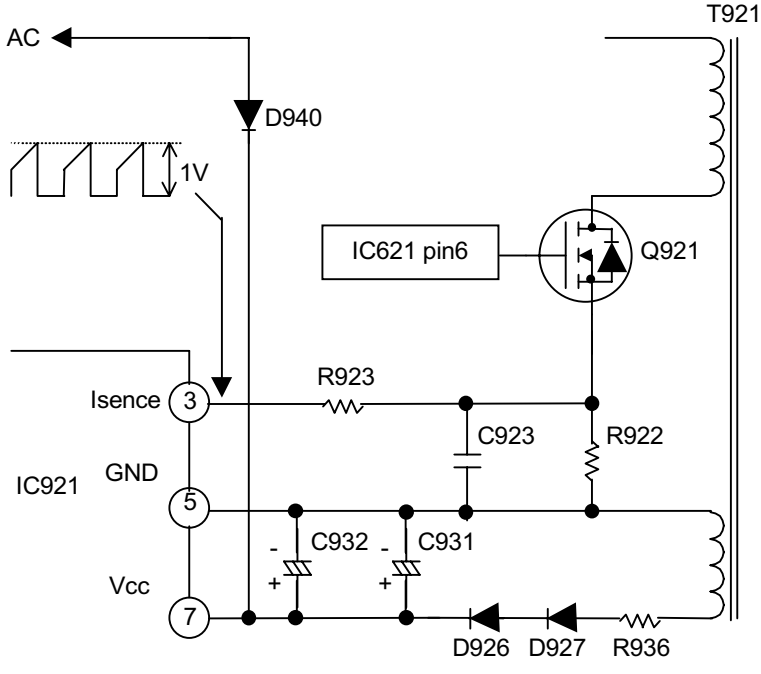
2-6-4. Power line overcurrent protection circuit

When the overall power output is increased on the secondary side on account of a certain abnormal condition, the peak voltage at Pin 3 of IC921 is also raised in proportion. When the peak voltage attains 1V at Pin 3 of IC921, IC921 functions to reduce the duty ON period of Q921. As a result, the output voltage on the secondary side of T921 and the auxiliary power source voltage begin to lower gradually. When the auxiliary winding voltage of T921 lowers below about 8V, IC921 suspends operation of the oscillator. During this period, however, C932 is constantly charged up via D940. When the voltage at Pin 7 of IC921 attains about 17V, the oscillator begins to operate in IC921 again. So long as the above-mentioned abnormal condition continues to hold, the oscillator repeats the sequence of stop and restart.

For the outputs of +15V and -15V, R9C1 and R9E1 are installed on the secondary side so that they can function to cut off this line when operation takes place for protection against the overcurrent.



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2-7. Vertical deflection circuit

2-7-1. Saw-teeth wave generator, vertical size and position control, and linearity control circuits

When a vertical sync signal input is applied to Pin 27 of IC500 and a horizontal sync signal input is applied to Pin 26 of IC500, an output of sawtooth waves is generated from Pin 4 of IC500, the frequency of which is the same as that of the input. When the respective correction data of vertical size, vertical position, vertical raster position, vertical linearity, and vertical linearity balance are received from the MPU (IC100), IC500 generates an output of sawtooth waves from Pin 4 after the completion of each correction. At that time, a DC voltage of 5V is output from Pin 7 of IC500. Both the sawtooth waves output from Pin 4 of IC500 and the DC voltage of 5V output from Pin 7 of IC500 are entered in Pin 2 and Pin 3 of IC461, respectively. For the sawtooth wave input entered in Pin 3 of IC461, the mid-point voltage is shifted from about 5.0V to about 0V, and the output is generated from Pin 1 of IC461. When the mid-point voltage is almost zero, the sawtooth wave output is generated from Pin 7 of IC461 after its noise has been removed at the low-pass filter consisting of R464 and C461. This output is then sent to the vertical output IC (IC451).

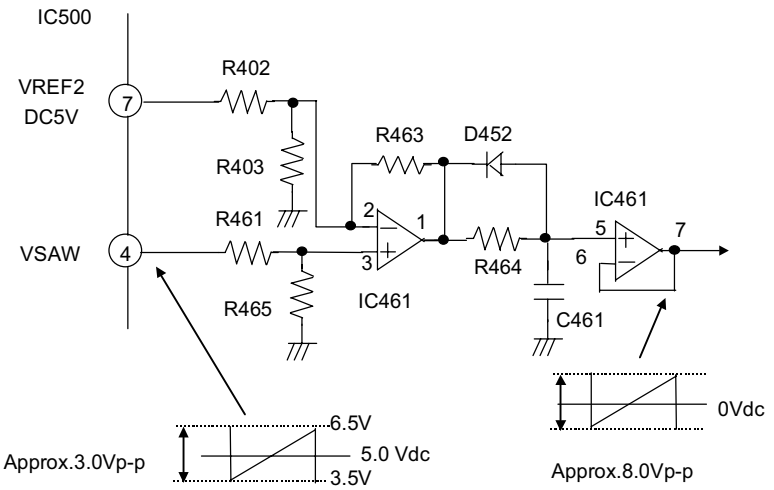

Fig. 2-7-1. Vertical wave output circuit

2-7-2. Vertical output amplifier circuit

A current, which is in proportion to the input voltage waveform to IC451, is led to the vertical deflection coil (V-DY). The vertical deflection current is picked up as a voltage waveform by R455, and is fed back to IC451.

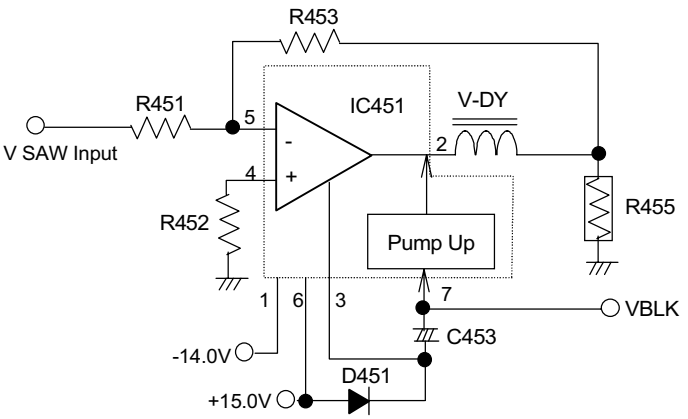

Fig. 2-7-2. Vertical output amplifier circuit

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3. Video circuit

3-1. Video pre-AMP

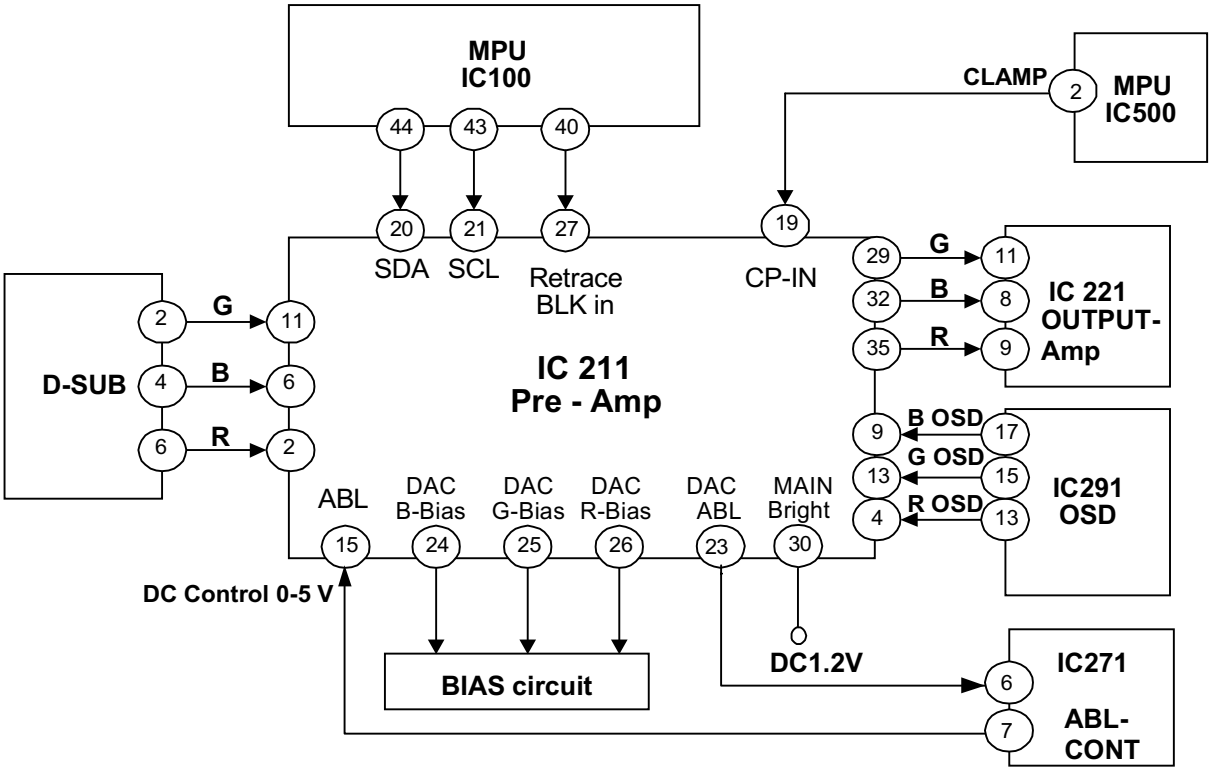

Fig. 3-1. Video pre-AMP

IC211 is a video pre-AMP IC. It is in charge of controlling the following functions.

3-1-1. Video signal mixing

The video signal is mixed with the OSD signal (at Pins 9, 13, 4 for B,G,R, respectively) by IC211. The black level is fixed at 1.2V by the main brightness that is a DC voltage at Pin 30. Since then, the signal is mixed with the horizontal blanking waveform and output from Pins 29, 32, and 35 for G, B, and R, respectively.

3-1-2. Video clamp

The clamped wave signal in positive polarity is output from Pin 28 of the oscillator IC (IC500), and is entered in Pin 19 of IC211.

3-1-3. Horizontal blanking

The blanking waveform in positive polarity is output from Pin 40 of the microcomputer (IC100) and entered in Pin 27 of IC211. During the periods of horizontal blanking and vertical blanking, a high level (TTL level) is maintained at Pin 27 and the video output of IC211 drops to 0.4V.

3-1-4. Video wink

At the moment when the received signal is switched over to another, the video output is used for blanking by the aid of a blanking signal (Wink) from Pin 40 of the microcomputer (IC100) to Pin 27 of IC211. By virtue of this function, no unstable pictures are displayed.

3-1-5. Contrast, white balance, and brightness controls

The MPU (IC100) sends out the control data of contrast, white balance, and brightness to IC211 in the 8-bit mode through the I^2C bus (SCL and SDA lines). The contrast data are used to control the cathode voltages of R, G, and B for the three channels at the same time. The white balance data are used for the gain control of R, G, and B, respectively. The brightness data are used for the simultaneous control of bias levels for R, G, and B, respectively. Since then, the brightness data are converted from digital to analog (DC voltage 0 to 5V) in IC211. The D/A output (B_bias, G_bias, and R_bias at Pins 24, 25, and 26, respectively) is transferred to the bias circuit.

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3-2. Video bias control circuit

The video signal is amplified to approximately 42Vp-p by IC221, and is then output from IC100. The BRIGHT voltage is amplified at the bias circuit so that the brightness can be controlled.

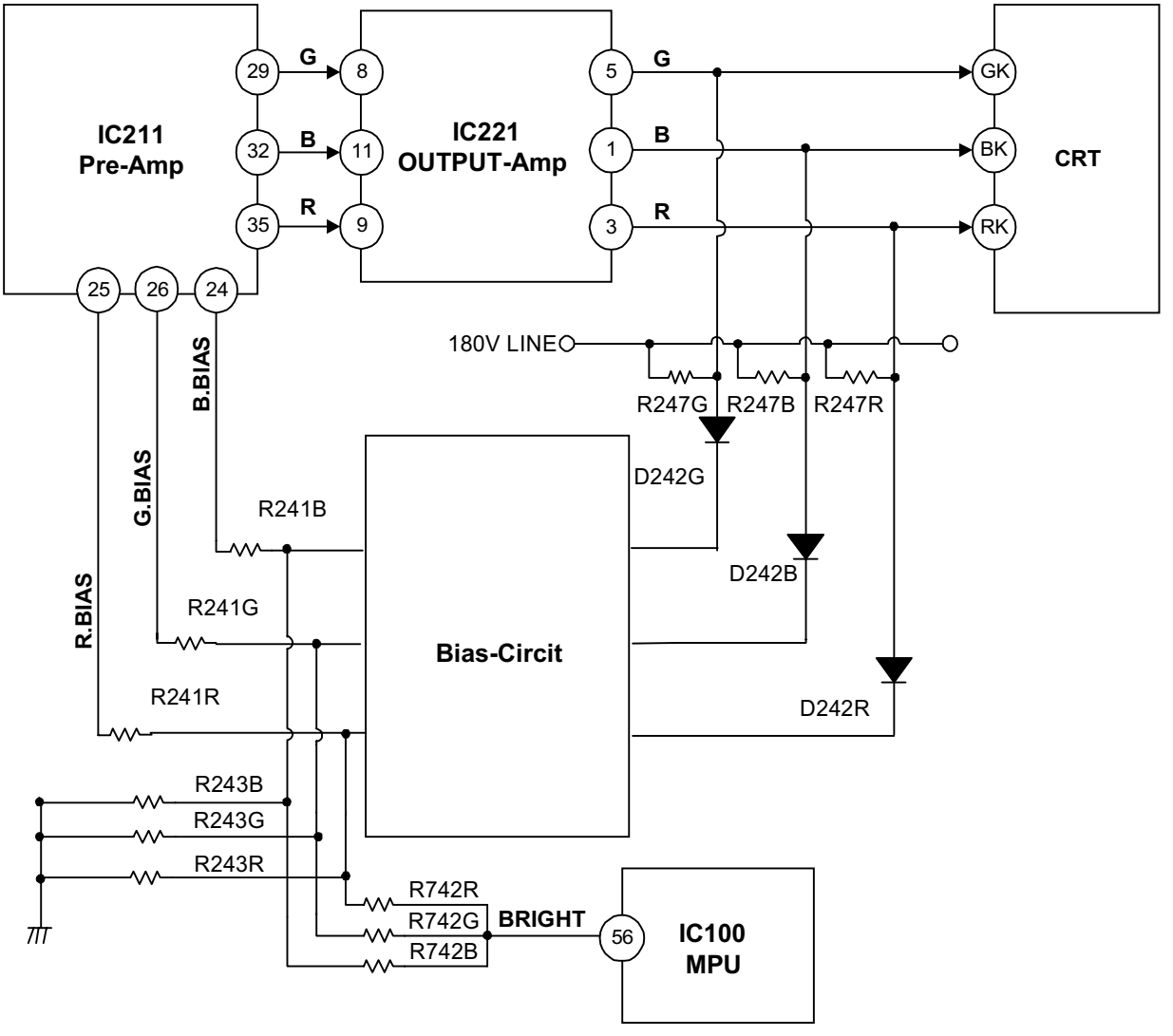

Fig. 3-2. Video bias control circuit

The brightness of the back raster is maintained at the DC clamp level of the output from the bias circuit. The black level is controlled at the CRT cathode. The brightness of the back raster is adjusted to +4cd/m^2 with the BRIGHT voltage. The output of the bias circuit is determined based on the bias and brightness of R, G, and B. The R/G/B bias is independently controlled from IC100, by controlling the D/A output from Pins 24, 25, and 26 of IC211, respectively, through the I^2C bus. The brightness signal used for the simultaneous control of the three R/G/B channels is obtained from the D/A output at Pin 56 of IC100. This signal is used to control the bias circuit via IC271.

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3-3. Blanking circuit

The horizontal and vertical blanking pulses synthesized at the microcomputer are applied to Pin 27 of IC211. These pulses are used for the blanking operation during the retrace period for both horizontal and vertical.

During the periods of signal mode changeover and power ON/OFF, the video blanking operation is effected by setting at the minimum levels the blanking pulses, contrast, and the brightness, which are output from the microcomputer.

3-4. Cutoff and ABL circuits

The cutoff circuit is composed of Q242R, Q242G, Q242B, Q241R, Q241G, and Q241B. Adjustments are possible for the three colors at the same time and for each color independently. In any case, control is effected by the microcomputer. For the adjustment of cutoff voltage for each color, the DAC output voltages at Pins 24, 25, and 26 of IC211 are controlled through the IIC bus by the microcomputer. Using these voltages, the emitter currents of Q241R, Q241G, and Q241B are controlled to determine the base voltages of Q242R, Q242G, and Q242B. In this manner, the cutoff voltage for each color can be adjusted. For the adjustment of bias voltage for the three colors in common, the DAC voltage at Pin 56 of the microcomputer is applied to the emitters of Q241R, Q241G, and Q241B through IC271. Thus, the collector currents of the three transistors are simultaneously controlled to adjust the brightness. Also for the ABL circuit, the ABL level adjustment is effected by the microcomputer. The detection of the beam current is conducted with the voltage at Pin 9 of T711. The divided voltage input is applied to Pin 5 of IC271. The differential output with the DAC voltage at Pin 23 of IC211 under the control from the microcomputer is generated from Pin 7 of IC271, and its output is entered in the ABL terminal of Pin 15 of IC211. For the adjustment of the ABL level by the microcomputer, the adjustment is carried out in terms of the brightness on the CRT tube. Therefore, the ABL circuit functions so that the brightness is maintained as constant on the all-white screen.

3-5. FPM (Fine picture mode)

The fine picture mode (FPM hereafter) is a function to secure the legibility of the displayed picture by lowering the brightness level and raising the contrast, so that a natural image can be effectively displayed.

During the FPM, the microcomputer controls the contrast through the IIC bus, and in addition it controls the port at Pin 14 of IC291 through the IIC bus. In this fashion, the video output bias point (pin 30) of IC211 is moved so that the black level can be controlled at the same time.

Voltage at the IC211 video output bias point (Pin 30)

In the normal mode : 1.2V

In the FPM mode : 0.8V

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4. Control circuit

4-1. Functions of the control circuit

The control circuit is mainly allocated in the MAIN PWB. This circuit is provided with the following functions:

- Auto-tracking
- Screen size, distortion, and position control
- Adjusting data storage
- Sync signal detection
- OSD control
- Video pre-AMP control and clamp pulse position control
- Power ON/OFF control
- Heater voltage control
- DDC 1/ 2B(/2Bi : Factory adjust only)
- Work time display

The control block is composed mainly of the four components specified below.

Microcomputer	: IC100 (MAIN PWB)
OSD IC	: IC291 (CRT PWB)
E^2PROM	: IC102 (MAIN PWB)
Sync signal input Tr	: Q16A,Q16E (MAIN PWB)

4-2. Auto-tracking processing

The microcomputer (IC100) measures the frequency of the input sync signal and generates the distortion compensation data output to the deflection IC (IC500), in compliance with the timing of the input signal.

Control of IC500 is effected via the I^2C bus.

4-3. E^2PROM

The E^2PROM (IC102) has a capacity of 16k bits (2k bytes). This memory keeps the factory adjustment data, user adjustment data, and the EDID data.

The number of presets is a maximum of 9 for the factory presets and a maximum of 16 for the user presets. In regard to the factory preset timing, the user calls the factory adjustment data when the user makes the memory reset operation.

The EDID data are stored in the last space of 128 bytes.

4-4. ON-screen display controller (OSD)

The ON-screen display controller (OSD) of IC291 performs screen display for the purposes of screen adjustments, etc. The OSD display data are sent from the microcomputer (IC100) via the I^2C bus.

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4-5. Heater voltage control

To enable the control of heater voltage according to the status of power save, etc., the heater voltage is controlled according to the PWM output (at Pin 42) of the microcomputer IC100. Based on the PWM pulses output from Pin 42 of the microcomputer, the voltage of 8V is lowered by the ON/OFF PWM operation of Q983, Q981, and Q982, the PWM pulses of Q981 are integrated at L981 and C982, the resultant voltage is divided at R111 and R112, and the divided voltage is fed back to Pin 27 (A/D input) of the microcomputer. The microcomputer supervises this feedback voltage in order to perform PWM control. In ordinary cases, therefore, the voltage is kept at 6.3V (typ). In the power save mode, the voltage is kept at 2.9V (typ).

For the overheat protection of the heater in the case of Q981 destruction, the power save mode is assumed when the feedback voltage at Pin 27 of the microcomputer exceeds the setting voltage level or higher. In this case, the screen display goes out to indicate that an abnormal mode is presently assumed.

4-6. Protection circuit operation

This monitor detects the condition of the abnormality shown below. The monitor has a function of stopping its operation if such an abnormal state is discovered. When the protector functions, the power LED flashes to indicate which protector is presently in operation.

To disable this protector for the purpose of repair services, etc., the factory mode should be assumed.

4-6-1. High voltage data error detection

The control values of high voltage, X-ray protector operating voltage, and such important data for safety protection are stored in the E^2PROM. These data have the backup data, respectively. If there is no coincidence between both data, the monitor is made to assume the power save mode. (High voltage is not built up.)

4-6-2. Deflection circuit stop detection

If there are no deflection pulse inputs at Pins 34 and 31 of the microcomputer (IC100), the microcomputer identifies such a condition as the stoppage of the deflection circuit. In this case, the monitor is made to assume the power save mode.

4-6-3. Beam current protector

If there is a flow of too much beam current (2mA or more), an input of “H” is applied to Pin 10 of the microcomputer (IC100). At this terminal, the microcomputer detects a flow of too much beam current and the monitor is made to assume the power save mode.

4-6-4. Heater voltage control error detection

When the heater voltage cannot be controlled due to the destruction of heater voltage controlling transistors Q981, Q982, Q983, etc., the monitor is made to assume the power save mode.

4-6-5. LED blinking patterns when each protector is in operation

When the protector operates, the following LEDs are made to flash to indicate the factor of protector operation.

LED Flash Patterns for Each Protector Operation (List of Protector Indicators)

Protector status	LED status	
	Short (0.5s) flash frequency	Long (2s) flash frequency
High voltage data error	3	1
Deflection circuit stop	4	1
Beam protector	5	1
Heater power error	6	1

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4-6-6. Work time

When “DIAGNOSIS” of the menu is selected in the factory mode, the work time of the monitor is displayed.

This value gains an additional time of 0.5 hours every 30 minutes.

P: Indicates the time when the power is turned on. (Including the time for the power save mode)

K: The current carry time for the heater is displayed.

4-6-7. DDC communication

The DDC communication is conducted by the microcomputer. The EDID data are read from the E^2PROM, the contents are stored in the RAM, and an output is generated from Pins 8 and 11 according to the request from the PC.

4-6-8. Microcomputer pin allocations

#	PORT	ASSIGN	I/O	FUNCTION	#	PORT	ASSIGN	I/O	FUNCTION
1	H_LOCK	IRQ2/P40	INT	H_UNLOCKdetection	64	LED_GREEN	P37	O	LED green
2	P41	IRQ1/P41	I	For flash writing	63	LED_RED	P36	O	LED red
3	P_DOWN	IRQ0/P42	INT	Servise interruption detect	62	CS6	P35	O	CS changeover 6
4	SOA	RD/P43	O	SOA output	61	CS5	P34	O	CS changeover 5
5	SUSPEND	WR/P44	O	Suspend	60	CS4	P33	O	CS changeover 4
6	OPTION1	IOS/AS/P45	O		59	CS3	P32	O	CS changeover 3
7	OPTION2	EXCL/o/P46	I	(Used as an input port)	58	CS2	P31	O	CS changeover 2
8	DDC_DATA	SDA0/WAIT	I/O	DDC data	57	CS1	P30	O	CS changeover 1
9	FLASH_TX	TxD0/P50	O	Beam protector	56	BRIGHTNESS	P10/PWMX0	PX	Brightness
10	BEAM/SHORT	RxD0/P50	I	DDC clock	55	HV_ADJ	P11/PWMX1	O	High voltage adjustment
11	DDC_CLK	SCL0/SCK0	I	Reset	54	V_STATIC	P12/PW2	P	V_STATIC_CONVER
12	RESET	RES	I	NMI	53	H_STATIC	P13/PW3	P	H_STATIC_CONVER
13	NMI	MNI	I		52	CP_BL	P14/PW4	P	Corner purity bottom left
14	(+) 5V	Vcc	S		51	CP_BR	P15/PW5	P	Corner purity bottom right
15	STBY	STBY	I		50	CP_TL	P16/PW6	P	Corner purity top left
16	GND	GND	S		49	CP_TR	P17/PW7	P	Corner purity top right
17	X'TAL	XTAL	S		48	GND	Vss		
18	X'TAL	EXTAL	S		47	H_CANCEL	P20/PW8	P	Horizontal field cancel output
19	MD1	MD1	S	Modal setting	46	V_CANCEL	P21/PW9	P	Vertical field cancel output
20	MD0	MD0	S	Modal setting	45	ROTATION	P22/PW10	O	Rotation
21	GND	AVss	S		44	IIC_DATA	SDA1	I/O	Internal IIC data
22	KEY2	AN0/P70	A/D	Key input	43	IIC_CLK	SCL1	I/O	Internal IIC clock
23	KEY1	AN1/P71	A/D	Key input	42	HEATER_OFF	P25/PW13	P	Heater source
24	X RAY PRO	AN2/P72	A/D	X-ray protector	41	LIN	P26/PW14	O	Horizontal linearity
25	TEMP	AN3/P73	A/D	Temperature detection	40	BLANKING	P27/PW15	O	Blanking output
26	TIME	AN4/P74	I	Time detection	39	Vcc	Vcc		
27	HEATER	AN4/P75	I	Heater voltage detection	38	H_SYNCO	P67/HSYNCO	O	Horizontal sync output
28	X_SENSE	AN6/P76	I	Horizontal field detection	37	C_SYNCI	P66/CSYNCI	I	SYNC ON G input
29	Y_SENSE	AN7/P77	I	Vertical field detection	36	H_SYNCI	P65/HSYNCI	I	Horizontal sync input
30	Vcc	AVcc	S		35	DEGAUSS	P64/CLAMPO	O	Degauss
31	HFBACK	HFBACK/P60	I	Horizontal deflection pulse input	34	VFBACKI	P63/VFBACKI	I	Vertical deflection pulse input
32	VSYNCO	VSYNCO/P61	O	Vertical sync output	33	V_SYNCI	V_SYNCI	I	Vertical sync input

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5. Adjustments

5-1. Adjusting modes

This monitor is provided with the following adjusting modes:

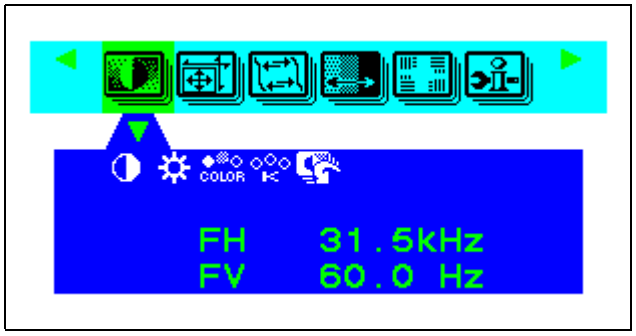
- User mode (Normal mode)
- Factory mode (Factory adjusting mode)

5-2. User mode (Normal mode)

This mode is used for the adjustment and setting to be made by the user. When any of the buttons ◀ , ▶ , ▼ , ▲ , +, and - is pressed at the front panel, the following menu screen is displayed.

The data adjusted in the user mode are automatically stored in the E^2PROM.

(For AUTO SAVE ON)



Using the buttons of, ◀ , ▶ , ▼ , and, ▲ the adjusting group and the adjusting item can be selected.

The buttons of + and - are used to change the adjusting values.

The items, which can be adjusted in the user mode, are as specified in the table below.

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List of OSD Adjustment Functions (User Adjustments)

Group	Item Name (ITEM)		Adjusting direction	
			-	+
		CONTRAST	Contrast lowered	Contrast raised
		BRIGHT	Brightness lowered	Brightness raised
		COLOR	RGB weakened	RGB strengthened
		COLOR TEMPERATURE	Color temperature lowered	Color temperature raised
		FACTORY RESET	N/A	Reset execution
		HORIZ-SIZE	Horizontal width narrowed	Horizontal width widened
		HORIZ-PHASE	Screen moved to the left	Screen moved to the right
		VERT-SIZE	Vertical width narrowed	Vertical width widened
		VERT-POSITION	Screen moved to the bottom	Screen moved to the top
		ROTATION	Counterclockwise rotation	Clockwise rotation
		GTF AUTO ADJUST	N/A	GTF auto-adjust execution
		FACTORY RESET	N/A	Reset execution
		PINCUSHION		
		PIN-BALANCE		
		KEYSTONE		
		KEY-BALANCE		
		TOP-PIN		
		BOTTOM-PIN		
		FACTORY RESET	N/A	Reset execution
		CORNER PURITY (TL)	Green screen turned red	Green screen turned blue
		CORNER PURITY (TR)	Green screen turned red	Green screen turned blue
		CORNER PURITY (BL)	Green screen turned red	Green screen turned blue
		CORNER PURITY (BR)	Green screen turned red	Green screen turned blue
		MOIRE CANCEL LEVEL	Amplitude narrowed	Amplitude expanded
		CLAMP PULSE POSITION	Front porch	Pack porch
		FACTORY RESET	N/A	Reset execution
		HORIZ-CONVERGENCE	Red moved to the left against green	Red moved to the right against green
		VERT-CONVERGENCE	Red moved to the bottom against green	Red moved to the top against green
		FACTORY RESET	N/A	Reset execution
		DEGAUSS	N/A	Degauss execution
		POWER SAVE	Power save OFF	Power save ON
		CONTROL LOCK	Control lock OFF	Control lock ON
		OSD POSITION	Menu position moved counterclockwise	Menu position moved clockwise
		OSD TURN OFF	Time decreased (Min. 0.5 sec.)	Time increased (Max. 120 sec.)
		DIAGNOSIS	Display only	
		LANGUAGE	Selected item moved to the left	Selected item moved to the right
		AUTO SAVE	Auto save OFF	Auto save ON
		ALL RESET	N/A	All rest execution
		FACTORY RESET	N/A	Reset execution

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5-3. Factory mode

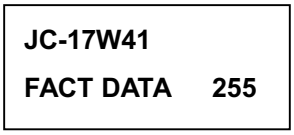
In this mode, adjustments are possible for all items. Modification is also carried out for the factory shipment adjustment data (reset data).

5-3-1. Method of factory mode setting

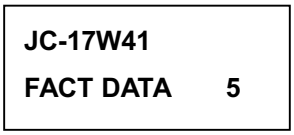
The factory mode is set in the following procedures:

Turn on the POWER supply with the FPM button kept pressed.

Press the [-] button once. Then, the OSD with the contents below is displayed.

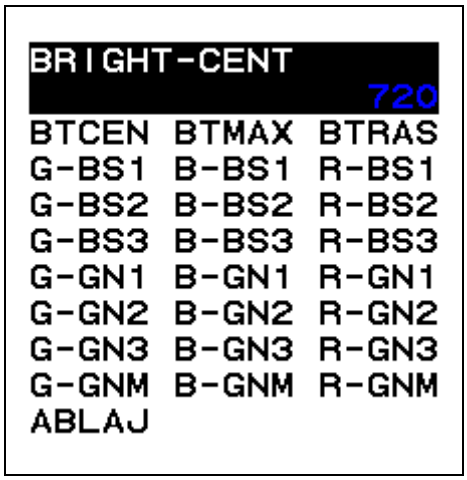


Press the [+] button to move the DATA to 5.



Press the ▸ button to move the mode to the factory mode.

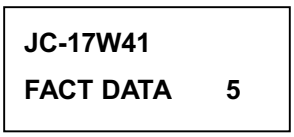
As shown below, the adjusting data (hexadecimal) and the adjustment groups of FAC1 and FAC2 are displayed.



5-3-2. Factory mode canceling

The factory mode is canceled in the following procedures:

Select the FAC2 group with the ▸ button and press this ▸ button again. Then, the OSD below is displayed.



Press the [+] button to move the DATA to 10.

Press the ▸ button to cancel the factory mode. The items, which are adjustable in the factory mode, are as shown in the table below. (It is also possible to adjust the items that can be adjusted in the user mode.)

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Items			Operation with the (-) button pressed	Operation with the (+) button pressed
FAC1	BTCEN	Bright-Center	Darkened	Brightened
	BTMAX	Bright-MAX	Darkened	Brightened
	BTRAS	Bright-RASTER	Darkened	Brightened
	G-BS1	Green-BIAS (@9300K)	Green weakened	Green intensified
	B-BS1	Blue-BIAS (@9300K)	Blue weakened	Blue intensified
	R-BS1	Red-BIAS (@9300K)	Red weakened	Red intensified
	G-BS2	Green-BIAS (@6500K)	Green weakened	Green intensified
	B-BS2	Blue-BIAS (@6500K)	Blue weakened	Blue intensified
	R-BS2	Red-BIAS (@6500K)	Red weakened	Red intensified
	G-BS3	Green-BIAS (@5000K)	Green weakened	Green intensified
	B-BS3	Blue-BIAS (@5000K)	Blue weakened	Blue intensified
	R-BS3	Red-BIAS (@5000K)	Red weakened	Red intensified
	G-GN1	Green-GAIN (@9300K)	Green weakened	Green intensified
	B-GN1	Blue-GAIN (@9300K)	Blue weakened	Blue intensified
	R-GN1	Red-GAIN (@9300K)	Red weakened	Red intensified
	G-GN2	Green-GAIN (@6500K)	Green weakened	Green intensified
	B-GN2	Blue-GAIN (@6500K)	Blue weakened	Blue intensified
	R-GN2	Red-GAIN (@6500K)	Red weakened	Red intensified
	G-GN3	Green-GAIN (@5000K)	Green weakened	Green intensified
	B-GN3	Blue-GAIN (@5000K)	Blue weakened	Blue intensified
	R-GN3	Red-GAIN (@5000K)	Red weakened	Red intensified
	G-GNM	Green-GAIN-MAX	Green weakened	Green intensified
	B-GNM	Blue-GAIN-MAX	Blue weakened	Blue intensified
	R-GNM	Red-GAIN-MAX	Red weakened	Red intensified
	ABL-ADJ	ABL adjust	Setting value lowered	Setting value raised
FAC2	PRDIS	Corner purity disable	Purity compensation enabled	Purity compensation disabled
*	HVZER	HV-ZERO	Zero point compensation disabled	Zero point compensation enabled
*	H-PUR	H-Purity	Counterclockwise rotation	Clockwise rotation
*	V-PUR	V-Purity	Shifted to the left	Shifted to the right
	SOG-E	Sync on Green enable	Sync On Green disabled	Sync On Green enabled
	WPDDC	White Protect DDC	Write protect disabled	Write protect enabled
	HVADJ	High-Voltage Adjust	High voltage lowered	High voltage raised
	X-ADJ	X-Prot. level adjsut	High voltage lowered	High voltage raised
	XPROT	X-Prot. Test	High voltage lowered	High voltage raised
	HFOCS	H focus amplitude	Amplitude narrowed	Amplitude expanded
	VFOCS	V focus amplitude	Amplitude narrowed	Amplitude expanded
	HFOCD	H focus phase	Phase delayed	Phase advanced
	V-BAL	V linearity balance	Top shortened	Bottom shortened
	V-LIN	V linearity	Moved upwards	Moved downwards
	HDUTY	H-DUTY	ON period of H drive pulse shortened	ON period of H drive pulse extended
	GTFHS	GTF-H SIZE	Horizontal width narrowed	Horizontal width widened
	GTFHP	GTF-H PHASE	Horizontal position moved to the left	Horizontal position moved to the right
	GTFVS	GTF-V SIZE	Vertical width narrowed	Vertical width widened
	GTFVP	GTF-V PHASE	Vertical position moved to the bottom	Vertical position moved to the top
	TPBAL	TOP-PIN-BALANCE	The top moved to the left	The top moved to the right
	BPBAL	BOTTOM-PIN-BALANC	The bottom moved to the left	The bottom moved to the right

* : Operation is disabled for the 19K chassis.

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REPLACEMENT PARTS LIST

The components specified for Model Diamond Pro 730 (B)

SYMBOL	Part No. of NPG	DESCRIPTION
*** ICS ***		
IC100	80009661	MOS HD6433577 A07P(M)
IC101	80009611	IC PST 600DMT
IC102	80009681	IC CAT24WC16J
IC211	80005341	IC M52743BSP
IC221	80001821	VIDEO DRIVE IC LM2407
IC271	80009621	IC M5223AL
IC291	80009671	IC M35071-067SP(OSD)
IC451	80007691	IC LA7841
IC461	80007761	IC BA4558F-E2(OP-AMP)
IC500	80009631	IC uPC1888BCT
IC701	80009641	IC AN5751
IC921	80011401	IC UC3842AM(LINFINITY)
IC922	80000321	IC PHOTO COUBLE TLP721F 4P
IC922	80010711	IC PHOTOCOUPLER TLP421F(GR)
IC951	80009651	IC uPC1093J
IC9G1	80010641	IC KA7812(TO-220)
IC9G1	80010651	IC KIA7812API(TO-220)
*** TRANSISTORS ***		
Q16A	EAA23690	TR NPN KSC PH2369 TO-92(T)
Q16E	EAA09456	TR NPN 2SC945 TO-92(T)
Q1C1	EBA07336	TR PNP 2SA733P TO-92(T)
Q1C2	EBA07336	TR PNP 2SA733P TO-92(T)
Q241B	EAA04220	TR NPN BF422 TO-92(T)
Q241G	EAA04220	TR NPN BF422 TO-92(T)
Q241R	EAA04220	TR NPN BF422 TO-92(T)
Q242B	EBA04230	TR PNP BF423 TO-92(T)
Q242G	EBA04230	TR PNP BF423 TO-92(T)
Q242R	EBA04230	TR PNP BF423 TO-92(T)
Q501	80003231	TR NPN KTC945-P TO-92(T)
Q502	EBA07336	TR PNP 2SA733P TO-92(T)
Q504	80010091	TR NPN KTC3875-YGL CHIP
Q505	80010101	TR PNP KTA1504-YG CHIP
Q506	80003231	TR NPN KTC945-P TO-92(T)
Q551	80010081	TR NPN 2SD1815-ST-TP
Q561	80004401	TR NPN 2SC5440 TO-3P
Q562	80003231	TR NPN KTC945-P TO-92(T)
Q571	80003231	TR NPN KTC945-P TO-92(T)
Q572	EAA12070	TR NPN 2SC945 TO-92(T)
Q573	EF206301	FET N YTAF630 TO-220F

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SYMBOL	Part No. of NPG	DESCRIPTION
Q574	EF206301	FET N YTAF630 TO-220F
Q575	EF20630A	FET N IRF630 TO-220F(SAMSUNG)
Q576	EF20630A	FET N IRF630 TO-220F(SAMSUNG)
Q577	EF206301	FET N YTAF630 TO-220F
Q581	EAA22355	TR NPN 2SC2235Y TO-92(T) (TOS
Q582	EBA09655	TR PNP 2SA965Y TO-92(T)
Q5G1	80009511	FET N 2SJ584/A
Q711	80000981	FET N 2SK2645-01 MR600V/9A
Q731	EBA07336	TR PNP 2SA733P TO-92(T)
Q761	80008211	TR NPN2SC4620 P-TV2
Q761	EAA40020	TR NPN 2SC4002 TO-92(T)(SANYO
Q801	80003231	TR NPN KTC945-P TO-92(T)
Q802	EAA09456	TR NPN 2SC945 TO-92(T)
Q803	EBA07336	TR PNP 2SA733P TO-92(T)
Q831	80003231	TR NPN KTC945-P TO-92(T)
Q832	EAA09456	TR NPN 2SC945 TO-92(T)
Q833	EBA07336	TR PNP 2SA733P TO-92(T)
Q841	80003231	TR NPN KTC945-P TO-92(T)
Q842	EAA09456	TR NPN 2SC945 TO-92(T)
Q843	EBA07336	TR PNP 2SA733P TO-92(T)
Q921	80000981	FET N 2SK2645-01 MR600V/9A
Q940	EAA00440	TR NPN KSP44 TO 92(T)
Q941	EAA09456	TR NPN 2SC945 TO-92(T)
Q942	EBA07336	TR PNP 2SA733P TO-92(T)
Q943	EAA09456	TR NPN 2SC945 TO-92(T)
Q981	80010111	TR PNP KTB1151-OY TO-126
Q982	EBA07336	TR PNP 2SA733P TO-92(T)
Q983	80009901	TR NPN DTC114WSA SPT(T)
Q9B1	EB20861A	TR PNP 2SB861C TO-220F
Q9B2	80010231	TR NPN KTC3200 TO-92(T)
Q9C1	EB307720	TR PNP KSB772 TO-126
Q9C2	EAA09456	TR NPN 2SC945 TO-92(T)
Q9F1	EAA12133	TR NPN 2SC1213AC TO-92(T)
Q9Y1	80009881	TR NPN 2SC1740S SPT(T)
Q9Y2	EBA07336	TR PNP 2SA733P TO-92(T)
Q9Y3	EAA09456	TR NPN 2SC945 TO-92(T)
Q9Z1	80003231	TR NPN KTC945-P TO-92(T)

*** DIODES ***

D104	EKA00707	ZEN DIODE 1/2W(T) HZ7C2 (HITAC
D143	EJ044148	DIODE "T" 1N4148
D144	EJ044148	DIODE "T" 1N4148
D161	EKA00707	ZEN DIODE 1/2W(T) HZ7C2 (HITAC
D1A3	EKA00707	ZEN DIODE 1/2W(T) HZ7C2 (HITAC
D1C1	80000131	LED L-59GH/1GYC
D205	EKA00707	ZEN DIODE 1/2W(T) HZ7C2 (HITAC
D206	EKA00707	ZEN DIODE 1/2W(T) HZ7C2 (HITAC
D212	EJ044148	DIODE "T" 1N4148

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SYMBOL	Part No. of NPG	DESCRIPTION
D221	80009721	DIODE/T 1N4005
D222B	80004711	ROHM DIODE 1SS244
D222G	80004711	ROHM DIODE 1SS244
D222R	80004711	ROHM DIODE 1SS244
D241B	80004711	ROHM DIODE 1SS244
D241G	80004711	ROHM DIODE 1SS244
D241R	80004711	ROHM DIODE 1SS244
D242B	80004711	ROHM DIODE 1SS244
D242G	80004711	ROHM DIODE 1SS244
D242R	80004711	ROHM DIODE 1SS244
D271	EJ044148	DIODE "T" 1N4148
D291	EJ044148	DIODE "T" 1N4148
D292	EKA00508	ZEN DIODE 1/2W(T) HZ5C3 (HITAC
D430	EKA00506	ZEN DIODE 1/2W(T) HZ5C1 (HITAC
D451	80009721	DIODE/T 1N4005
D452	EJ044148	DIODE "T" 1N4148
D501	EKA0150A	ZEN DIODE 1/2W(T) HZ 151 (HITAC
D502	EKA0150A	ZEN DIODE 1/2W(T) HZ 151 (HITAC
D551	EJ044148	DIODE "T" 1N4148
D561	80009731	DIODE/A SR560(DO-201ADM21)
D562	80005371	DIODE FMQ-G2FS TO220
D563	EKA00506	ZEN DIODE 1/2W(T) HZ5C1 (HITAC
D564	EJ044148	DIODE "T" 1N4148
D581	EJAC0017	DIODE/T 1A 1N4936
D582	EJAC0017	DIODE/T 1A 1N4936
D5G1	EJ044148	DIODE "T" 1N4148
D5G2	80009761	DIODE/T UF4004
D701	EKA00903	ZEN DIODE 1/2W(T) HZ9B1 (HITAC
D703	EJ044148	DIODE "T" 1N4148
D704	EJ044148	DIODE "T" 1N4148
D705	EJ044148	DIODE "T" 1N4148
D711	80009771	DIODE/A UF5408
D712	80009771	DIODE/A UF5408
D713	80009761	DIODE/T UF4004
D714	80009761	DIODE/T UF4004
D731	EKA0150A	ZEN DIODE 1/2W(T) HZ 151 (HITAC
D741	80009721	DIODE/T 1N4005
D742	EKA00906	ZEN DIODE 1/2W(T) HZ9C1 (HITAC
D761	80009741	DIODE/T UF4005
D893	EJ044148	DIODE "T" 1N4148
D911	EJB20001	DIODE/A 3A 1N5406
D912	EJB20001	DIODE/A 3A 1N5406
D913	EJB20001	DIODE/A 3A 1N5406
D914	EJB20001	DIODE/A 3A 1N5406
D921	EJA20003	DIODE/T 1A BA159
D922	EKA0240C	ZEN DIODE 1/2W(T) HZ243(HITAC
D923	EJ044148	DIODE "T" 1N4148
D924	EJ044148	DIODE "T" 1N4148

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SYMBOL	Part No. of NPG	DESCRIPTION
D926	EJAC0017	DIODE/T 1A 1N4936
D927	EJAC0017	DIODE/T 1A 1N4936
D940	EJ044148	DIODE "T" 1N4148
D941	EKA0200B	ZEN DIODE 1/2W(T) HZ 20.2 (HITA
D942	EKA0270A	ZEN DIODE 1/2W(T) HZ 271 (HITAC
D943	80004711	ROHM DIODE 1SS244
D981	80009751	DIODE/T HER103
D9A1	80003561	DIODE 600V/1.6A RG2A(LFA1) SAN
D9A2	80009721	DIODE/T 1N4005
D9B1	80011151	DIODE , 3A 600V RL4A
D9C1	80002981	DIODE 3A/200V RG4Z
D9D1	80001401	DIODE 3A/200V RG4Z SANKEN
D9E1	80002981	DIODE 3A/200V RG4Z
D9F1	EJ044148	DIODE "T" 1N4148
D9F2	EKA00506	ZEN DIODE 1/2W(T) HZ5C1 (HITAC
D9F3	EJ044148	DIODE "T" 1N4148
D9Y3	80000451	DIODE/T 1/2W 1SS83
D9Y4	EKA00607	ZEN DIODE 1/2W(T) HZ6C2 (HITAC
D9Y5	80009751	DIODE/T HER103
D9Z1	EJ044148	DIODE "T" 1N4148

*** TRANSFORMERS ***

T551	80009551	H.DRIVE X'FM EE19
T561	80009561	H.OUT X'FM EE22
T711	80009581	FBT CN980(MURATA)
T751	80009591	DF X'FM EE19
T921	80009601	POWER X'FM ERL39 500UH

*** VARIABLE RESISTORS ***

VR581	FF300103	VR CARBON 6MM10K VZ067TH1

*** RELAYS & SWITCHES ***

SW1X1	80000251	TACT SW 1P 100+-50G
SW1X3	80000251	TACT SW 1P 100+-50G
SW1X4	80000251	TACT SW 1P 100+-50G
SW1X5	80000251	TACT SW 1P 100+-50G
SW1X6	80000251	TACT SW 1P 100+-50G
SW1X7	80000251	TACT SW 1P 100+-50G
SW1X8	80000251	TACT SW 1P 100+-50G
SW901	80006061	SW SDKLA 10200

*** PWB ASSYS ***

A09	7C0071MM	CRT BD ASSY
A10	7M0071MM	MAIN BD ASSY

*** COILS & FILTERS ***

L101	HB012100	PACKING COIL/T5 10uH K (EC22)
L212	HB012151	PACKING COIL/T5 150uH K (EC22)

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SYMBOL	Part No. of NPG	DESCRIPTION
L221B	HB012478	PACKING COIL/T5 0.47uH M (EC22
L221G	HB012478	PACKING COIL/T5 0.47uH M (EC22
L221R	HB012478	PACKING COIL/T5 0.47uH M (EC22
L241	80010611	BEAD WBRH-3.5*6*0.8*2-TF7(5mm)
L242	80010611	BEAD WBRH-3.5*6*0.8*2-TF7(5mm)
L243	80010611	BEAD WBRH-3.5*6*0.8*2-TF7(5mm)
L291	HB012470	PACKING COIL/T5 47uH K (EC22)
L2C1	80010611	BEAD WBRH-3.5*6*0.8*2-TF7(5mm)
L2F1	80010611	BEAD WBRH-3.5*6*0.8*2-TF7(5mm)
L2F2	80010611	BEAD WBRH-3.5*6*0.8*2-TF7(5mm)
L2F5	HB012100	PACKING COIL/T5 10uH K (EC22)
L452	HB020100	PACKING COIL/A 10uH K (PK0810)
L562	80007671	BEAD 2.3*7.5*7.3/T
L581	80011001	CHOKE COIL 10mH DR10*16
L5A1	80011001	CHOKE COIL 10mH DR10*16
L5A2	HB020821	PACKING COIL/A 820uH K (PK0810
L5A3	HB020821	PACKING COIL/A 820uH K (PK0810
L5G1	HB020101	PACKING COIL/A 100uH K (PK0810
L5G2	80007671	BEAD 2.3*7.5*7.3/T
L711	HB020339	PACKING COIL/A 3.3uH K (PK0810)
L712	HB020330	PACKING COIL/A 33uH K (PK0810)
L713	80010611	BEAD WBRH-3.5*6*0.8*2-TF7(5mm)
L771	80010611	BEAD WBRH-3.5*6*0.8*2-TF7(5mm)
L901	80000111	LINE FILTER ET24 11mH
L902	HB000015	LINE FILTER UU10.5 1mH
L921	80007671	BEAD 2.3*7.5*7.3/T
L922	80000991	BEAD WBR6H-3T-R7K-B5
L981	HB020330	PACKING COIL/A 33uH K (PK0810)
L9A1	HC006002	BEAD 3.5*4.7/T
L9A2	80000991	BEAD WBR6H-3T-R7K-B5
L9B1	80000991	BEAD WBR6H-3T-R7K-B5
L9B2	HC006002	BEAD 3.5*4.7/T
L9B3	HC006002	BEAD 3.5*4.7/T
L9C1	HC006002	BEAD 3.5*4.7/T
L9D1	HC006002	BEAD 3.5*4.7/T
L9E1	HC006002	BEAD 3.5*4.7/T
L9Y1	80009501	HARMONIC COIL EE35 88uH
T571	80009571	LINEARITY COIL CN980

*** ELECTRICAL PARTS & MISCELLANEOUS PARTS ***

CN202	80007601	CRT SOCKET CVT3280-5101
CN901	JD512001	AC SOCKET 3P
DEG	80009531	DEGAUSSING COIL CN980
F901	80001521	FUSE 3.15A/250V 50T
P-CORD	80001651	POWER CORD 3P 1.8M EUROPE
RP9Z1	80005821	THERMISTOR PTCR 4.5OHM
RY9Y1	80005831	RELAY 12V 8 P MI-SS-212D
RY9Z1	80009521	RELAY SDT-S-112LMR

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SYMBOL	Part No. of NPG	DESCRIPTION
S/C	80010261	SIGNAL CABLE CN980
TH901	80000801	THERMISTOR NTCR SCK054
X101	EM020004	X'TAL 49U 20MHZ +/-30PPM

*** APPEARANCE PARTS ***

A01	10101661	CABINET FRONT ASSY
A02	10101471	CABINET BACK
A03	11000451	REVOLVING STAND ASSY
CHASSI	12000561	CHASSIS BASE

*** PRINTED & PACKING MATERIALS ***

A04	13201031	CARTON BOX DPro730
A05	13400451	POLYLON(T)
A06	13400461	POLYLON(B)
A08	15000921	NAME PLATE INSTRUCTION DPro7
MANU	15500741	OWNERS MANUAL DPro730
A07	13700051	BAG,POLYETHYLENE

*** RESISTORS ***

R102	FM100101	CHIP 1/8W(T) 5% 100ohm
R106	FA040101	CARBON 1/8W(T) 5% 100ohm
R107	FA040101	CARBON 1/8W(T) 5% 100ohm
R109	FM100103	CHIP 1/8W(T) 5% 10Kohm
R10A	FM100103	CHIP 1/8W(T) 5% 10Kohm
R10D	FA040103	CARBON 1/8W(T) 5% 10Kohm
R10F	FM100103	CHIP 1/8W(T) 5% 10Kohm
R10G	FM100101	CHIP 1/8W(T) 5% 100ohm
R10H	FM100101	CHIP 1/8W(T) 5% 100ohm
R10J	FM100101	CHIP 1/8W(T) 5% 100ohm
R10L	FM100000	CHIP 1/8W(T) 5% 0ohm
R10N	FM100103	CHIP 1/8W(T) 5% 10Kohm
R10P	FM100101	CHIP 1/8W(T) 5% 100ohm
R10Q	FM100102	CHIP 1/8W(T) 5% 1Kohm
R10R	FM100101	CHIP 1/8W(T) 5% 100ohm
R10S	FM100102	CHIP 1/8W(T) 5% 1Kohm
R10T	FM100101	CHIP 1/8W(T) 5% 100ohm
R10U	FM100103	CHIP 1/8W(T) 5% 10Kohm
R10Y	FM100103	CHIP 1/8W(T) 5% 10Kohm
R111	FA040472	CARBON 1/8W(T) 5% 4.7Kohm
R112	FA040472	CARBON 1/8W(T) 5% 4.7Kohm
R115	FM100102	CHIP 1/8W(T) 5% 1Kohm
R116	FA040101	CARBON 1/8W(T) 5% 100ohm
R119	FM100101	CHIP 1/8W(T) 5% 100ohm
R11A	FM100101	CHIP 1/8W(T) 5% 100ohm
R11C	FA040103	CARBON 1/8W(T) 5% 10Kohm
R11D	FM100221	CHIP 1/8W(T) 5% 220ohm
R11E	FM100392	CHIP 1/8W(T) 5% 3.9Kohm
R11F	FM100221	CHIP 1/8W(T) 5% 220ohm

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SYMBOL	Part No. of NPG	DESCRIPTION
R11G	FM100182	CHIP 1/8W(T) 5% 1.8Kohm
R11H	FA040472	CARBON 1/8W(T) 5% 4.7Kohm
R11Q	FM100103	CHIP 1/8W(T) 5% 10Kohm
R11R	FM100103	CHIP 1/8W(T) 5% 10Kohm
R11S	FM100103	CHIP 1/8W(T) 5% 10Kohm
R11T	FM100103	CHIP 1/8W(T) 5% 10Kohm
R11U	FM100103	CHIP 1/8W(T) 5% 10Kohm
R11V	FM100103	CHIP 1/8W(T) 5% 10Kohm
R11W	FM100103	CHIP 1/8W(T) 5% 10Kohm
R121	FM100103	CHIP 1/8W(T) 5% 10Kohm
R122	FM100103	CHIP 1/8W(T) 5% 10Kohm
R123	FM100103	CHIP 1/8W(T) 5% 10Kohm
R125	FM100101	CHIP 1/8W(T) 5% 100ohm
R141	FM100101	CHIP 1/8W(T) 5% 100ohm
R142	FA040101	CARBON 1/8W(T) 5% 100ohm
R14A	FM100101	CHIP 1/8W(T) 5% 100ohm
R14C	FM100472	CHIP 1/8W(T) 5% 4.7Kohm
R14D	FA040101	CARBON 1/8W(T) 5% 100ohm
R14E	FM100101	CHIP 1/8W(T) 5% 100ohm
R14G	FM100000	CHIP 1/8W(T) 5% 0ohm
R14J	FM100392	CHIP 1/8W(T) 5% 3.9Kohm
R14M	FA040103	CARBON 1/8W(T) 5% 10Kohm
R14N	FA040103	CARBON 1/8W(T) 5% 10Kohm
R14P	FA040103	CARBON 1/8W(T) 5% 10Kohm
R14Q	FM100000	CHIP 1/8W(T) 5% 0ohm
R14T	FM100103	CHIP 1/8W(T) 5% 10Kohm
R165	FM100472	CHIP 1/8W(T) 5% 4.7Kohm
R166	FM100472	CHIP 1/8W(T) 5% 4.7Kohm
R16A	FA040102	CARBON 1/8W(T) 5% 1Kohm
R16C	FA040103	CARBON 1/8W(T) 5% 10Kohm
R16E	FA040102	CARBON 1/8W(T) 5% 1Kohm
R181	FA040101	CARBON 1/8W(T) 5% 100ohm
R182	FM100103	CHIP 1/8W(T) 5% 10Kohm
R184	FM100101	CHIP 1/8W(T) 5% 100ohm
R185	FM100562	CHIP 1/8W(T) 5% 5.6Kohm
R1C1	FA040221	CARBON 1/8W(T) 5% 220ohm
R1C2	FA040181	CARBON 1/8W(T) 5% 180ohm
R1C3	FA040682	CARBON 1/8W(T) 5% 6.8Kohm
R1C5	FA040682	CARBON 1/8W(T) 5% 6.8Kohm
R1X1	FA040331	CARBON 1/8W(T) 5% 330ohm
R1X2	FA040681	CARBON 1/8W(T) 5% 680ohm
R1X3	FA040202	CARBON 1/8W(T) 5% 2Kohm
R1X4	FA040331	CARBON 1/8W(T) 5% 330ohm
R1X5	FA040681	CARBON 1/8W(T) 5% 680ohm
R1X6	FA040202	CARBON 1/8W(T) 5% 2Kohm
R201B	FB277509	METAL 1/4W/M(T) 1% 75ohm
R201G	FB277509	METAL 1/4W/M(T) 1% 75ohm
R201R	FB277509	METAL 1/4W/M(T) 1% 75ohm

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SYMBOL	Part No. of NPG	DESCRIPTION
R202	FA040222	CARBON 1/8W(T) 5% 2.2Kohm
R203	FA040222	CARBON 1/8W(T) 5% 2.2Kohm
R211B	FA040331	CARBON 1/8W(T) 5% 330ohm
R211G	FA040331	CARBON 1/8W(T) 5% 330ohm
R211R	FA040331	CARBON 1/8W(T) 5% 330ohm
R212B	FA040102	CARBON 1/8W(T) 5% 1Kohm
R212G	FA040102	CARBON 1/8W(T) 5% 1Kohm
R212R	FA040102	CARBON 1/8W(T) 5% 1Kohm
R214	FA360101	CARBON 1/2W/M(T) 5% 100ohm
R215	FB273302	METAL 1/4W/M(T) 1% 33Kohm
R216	FB273601	METAL 1/4W/M(T) 1% 3.6Kohm
R217	FA040101	CARBON 1/8W(T) 5% 100ohm
R218	FA040101	CARBON 1/8W(T) 5% 100ohm
R219	FA040101	CARBON 1/8W(T) 5% 100ohm
R21A	FA040101	CARBON 1/8W(T) 5% 100ohm
R21C	FA040682	CARBON 1/8W(T) 5% 6.8Kohm
R21E	FA040222	CARBON 1/8W(T) 5% 2.2Kohm
R21F	FA040822	CARBON 1/8W(T) 5% 8.2Kohm
R221B	FA040470	CARBON 1/8W(T) 5% 47ohm
R221G	FA040470	CARBON 1/8W(T) 5% 47ohm
R221R	FA040470	CARBON 1/8W(T) 5% 47ohm
R222B	80009801	FUSEBLE Res 1/2W(A)M 100ohm J
R222G	80009801	FUSEBLE Res 1/2W(A)M 100ohm J
R222R	80009801	FUSEBLE Res 1/2W(A)M 100ohm J
R241B	FA040273	CARBON 1/8W(T) 5% 27Kohm
R241G	FA040273	CARBON 1/8W(T) 5% 27Kohm
R241R	FA040273	CARBON 1/8W(T) 5% 27Kohm
R242B	FA040103	CARBON 1/8W(T) 5% 10Kohm
R242G	FA040103	CARBON 1/8W(T) 5% 10Kohm
R242R	FA040103	CARBON 1/8W(T) 5% 10Kohm
R243B	FA040683	CARBON 1/8W(T) 5% 68Kohm
R243G	FA040683	CARBON 1/8W(T) 5% 68Kohm
R243R	FA040683	CARBON 1/8W(T) 5% 68Kohm
R244B	FA040683	CARBON 1/8W(T) 5% 68Kohm
R244G	FA040683	CARBON 1/8W(T) 5% 68Kohm
R244R	FA040683	CARBON 1/8W(T) 5% 68Kohm
R245B	FA040154	CARBON 1/8W(T) 5% 150Kohm
R245G	FA040154	CARBON 1/8W(T) 5% 150Kohm
R245R	FA040154	CARBON 1/8W(T) 5% 150Kohm
R247B	FA040224	CARBON 1/8W(T) 5% 220Kohm
R247G	FA040224	CARBON 1/8W(T) 5% 220Kohm
R247R	FA040224	CARBON 1/8W(T) 5% 220Kohm
R249	FA040103	CARBON 1/8W(T) 5% 10Kohm
R24A	FA040103	CARBON 1/8W(T) 5% 10Kohm
R24C	FA040470	CARBON 1/8W(T) 5% 47ohm
R24E	FA040101	CARBON 1/8W(T) 5% 100ohm
R271	FA040102	CARBON 1/8W(T) 5% 1Kohm
R272	FA040223	CARBON 1/8W(T) 5% 22Kohm

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SYMBOL	Part No. of NPG	DESCRIPTION
R273	FA040103	CARBON 1/8W(T) 5% 10Kohm
R274	FA040101	CARBON 1/8W(T) 5% 100ohm
R276	FA040273	CARBON 1/8W(T) 5% 27Kohm
R291	FA040101	CARBON 1/8W(T) 5% 100ohm
R292B	FA040101	CARBON 1/8W(T) 5% 100ohm
R292G	FA040101	CARBON 1/8W(T) 5% 100ohm
R292R	FA040101	CARBON 1/8W(T) 5% 100ohm
R293	FA040102	CARBON 1/8W(T) 5% 1Kohm
R294	FA040152	CARBON 1/8W(T) 5% 1.5Kohm
R295	FA040101	CARBON 1/8W(T) 5% 100ohm
R296	FA040101	CARBON 1/8W(T) 5% 100ohm
R297	FB271001	METAL 1/4W/M(T) 1% 1Kohm
R298	FA040102	CARBON 1/8W(T) 5% 1Kohm
R2C1B	FA360680	CARBON 1/2W/M(T) 5% 68ohm
R2C1G	FA360680	CARBON 1/2W/M(T) 5% 68ohm
R2C1R	FA360680	CARBON 1/2W/M(T) 5% 68ohm
R2C2	FA360221	CARBON 1/2W/M(T) 5% 220ohm
R400	FN104702	CHIP 1/8W(T) 1% 47Kohm
R401	FA040101	CARBON 1/8W(T) 5% 100ohm
R402	FB271302	METAL 1/4W/M(T) 1% 13Kohm
R403	FN103302	CHIP 1/8W(T) 1% 33Kohm
R430	FA040101	CARBON 1/8W(T) 5% 100ohm
R431	FA040392	CARBON 1/8W(T) 5% 3.9Kohm
R432	FA040103	CARBON 1/8W(T) 5% 10Kohm
R451	FN101302	CHIP 1/8W(T) 1% 13Kohm
R452	FB272401	METAL 1/4W/M(T) 1% 2.4Kohm
R453	FB273001	METAL 1/4W/M(T) 1% 3Kohm
R454	FB470221	MOF 1W/M(A) 5% 220ohm
R455	FB470109	MOF 1W/M(A) 5% 1ohm
R456	FA270109	CARBON 1/4W/M(T) 5% 1ohm
R461	FB248201	METAL 1/4W(T) 1% 8.2Kohm
R463	FN102702	CHIP 1/8W(T) 1% 27Kohm
R464	FN101002	CHIP 1/8W(T) 1% 10Kohm
R465	FN102702	CHIP 1/8W(T) 1% 27Kohm
R500	FA040101	CARBON 1/8W(T) 5% 100ohm
R501	FA040101	CARBON 1/8W(T) 5% 100ohm
R502	FA040102	CARBON 1/8W(T) 5% 1Kohm
R503	FA040102	CARBON 1/8W(T) 5% 1Kohm
R504	FA040101	CARBON 1/8W(T) 5% 100ohm
R505	FN101801	CHIP 1/8W(T) 1% 1.8Kohm
R506	FN101801	CHIP 1/8W(T) 1% 1.8Kohm
R507	FM100101	CHIP 1/8W(T) 5% 100ohm
R508	FA040101	CARBON 1/8W(T) 5% 100ohm
R509	FM100223	CHIP 1/8W(T) 5% 22Kohm
R510	FA040101	CARBON 1/8W(T) 5% 100ohm
R511	FA040101	CARBON 1/8W(T) 5% 100ohm
R512	FM100101	CHIP 1/8W(T) 5% 100ohm
R514	FN102202	CHIP 1/8W(T) 1% 22Kohm

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SYMBOL	Part No. of NPG	DESCRIPTION
R515	FN101002	CHIP 1/8W(T) 1% 10Kohm
R517	FA040101	CARBON 1/8W(T) 5% 100ohm
R518	FN105601	CHIP 1/8W(T) 1% 5.6Kohm
R519	FN101002	CHIP 1/8W(T) 1% 10Kohm
R522	FM100152	CHIP 1/8W(T) 5% 1.5Kohm
R523	FN103601	CHIP 1/8W(T) 1% 3.6Kohm
R524	FM100822	CHIP 1/8W(T) 5% 8.2Kohm
R525	FM100000	CHIP 1/8W(T) 5% 0ohm
R551	80009811	FUSEBLE Res 1/2W(A)M 1ohm J
R552	FA040100	CARBON 1/8W(T) 5% 10ohm
R553	FA270471	CARBON 1/4W/M(T) 5% 470ohm
R554	FA040222	CARBON 1/8W(T) 5% 2.2Kohm
R555	FB470390	MOF 1W/M(A) 5% 39ohm
R561	80011451	IC UC3842AM(LINFINITY)
R564	FA360270	CARBON 1/2W/M(T) 5% 27ohm
R567	FA360392	CARBON 1/2W/M(T) 5% 3.9Kohm
R568	FA270471	CARBON 1/4W/M(T) 5% 470ohm
R569	80009821	FUSEBLE Res 1/2W(A)M 1.2ohm J
R571	FA040682	CARBON 1/8W(T) 5% 6.8Kohm
R575	FB560150	MOF 2W/M(A) 5% 15ohm
R576	FA040221	CARBON 1/8W(T) 5% 220ohm
R577	FB560271	MOF 2W/M(A) 5% 270ohm
R578	FA040221	CARBON 1/8W(T) 5% 220ohm
R579	FA270684	CARBON 1/4W/M(T) 5% 680Kohm
R57E	FA040221	CARBON 1/8W(T) 5% 220ohm
R57F	FA270104	CARBON 1/4W/M(T) 5% 100Kohm
R57G	FA040221	CARBON 1/8W(T) 5% 220ohm
R57H	FA270104	CARBON 1/4W/M(T) 5% 100Kohm
R57J	FA040221	CARBON 1/8W(T) 5% 220ohm
R57K	FA270474	CARBON 1/4W/M(T) 5% 470Kohm
R57L	FA040221	CARBON 1/8W(T) 5% 220ohm
R57M	FA270474	CARBON 1/4W/M(T) 5% 470Kohm
R57R	FB470150	MOF 1W/M(A) 5% 15ohm
R581	FB470229	MOF 1W/M(A) 5% 2.2ohm
R582	FB470229	MOF 1W/M(A) 5% 2.2ohm
R583	FA040472	CARBON 1/8W(T) 5% 4.7Kohm
R58B	FA360479	CARBON 1/2W/M(T) 5% 4.7ohm
R5A1	FB560150	MOF 2W/M(A) 5% 15ohm
R5A2	FA270680	CARBON 1/4W/M(T) 5% 68ohm
R5A3	80012081	FUSEBLE Res 1/2W(A)M 47ohm J
R5G1	FA270392	CARBON 1/4W/M(T) 5% 3.9Kohm
R5G2	FA270330	CARBON 1/4W/M(T) 5% 33ohm
R5G3	FB470109	MOF 1W/M(A) 5% 1ohm
R702	FA040473	CARBON 1/8W(T) 5% 47Kohm
R703	FA040472	CARBON 1/8W(T) 5% 4.7Kohm
R704	FB275601	METAL 1/4W/M(T) 1% 5.6Kohm
R705	FB271501	METAL 1/4W/M(T) 1% 1.5Kohm
R706	FA040103	CARBON 1/8W(T) 5% 10Kohm

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SYMBOL	Part No. of NPG	DESCRIPTION
R708	FA040121	CARBON 1/8W(T) 5% 120ohm
R709	FA040472	CARBON 1/8W(T) 5% 4.7Kohm
R70A	80009861	FUSEBLE Res 1/4W(A)M 10ohm J
R711	FA360109	CARBON 1/2W/M(T) 5% 1ohm
R712	FB470278	MOF 1W/M(A) 5% 0.27ohm
R714	FB710330	MOF 3W/M(A) 5% 33ohm
R715	FB710390	MOF 3W/M(A) 5% 39ohm
R716	FA270563	CARBON 1/4W/M(T) 5% 56Kohm
R721	FB274702	METAL 1/4W/M(T) 1% 47Kohm
R731	FA040223	CARBON 1/8W(T) 5% 22Kohm
R732	FA040103	CARBON 1/8W(T) 5% 10Kohm
R733	FA040103	CARBON 1/8W(T) 5% 10Kohm
R734	FA040682	CARBON 1/8W(T) 5% 6.8Kohm
R735	FA040102	CARBON 1/8W(T) 5% 1Kohm
R736	FA040102	CARBON 1/8W(T) 5% 1Kohm
R737	FA040223	CARBON 1/8W(T) 5% 22Kohm
R741	80009851	FUSEBLE Res 1/4W(A) 0.47ohm J
R742	FB274301	METAL 1/4W/M(T) 1% 4.3Kohm
R743	FB276801	METAL 1/4W/M(T) 1% 6.8Kohm
R744	FB271802	METAL 1/4W/M(T) 1% 18Kohm
R745	FB271002	METAL 1/4W/M(T) 1% 10Kohm
R756	80009961	FUSEABLE RES. 3W(A)M 3.3ohm J
R762	FB273301	METAL 1/4W/M(T) 1% 3.3Kohm
R763	FA270154	CARBON 1/4W/M(T) 5% 150Kohm
R764	80009811	FUSEBLE Res 1/2W(A)M 1ohm J
R765	FA270184	CARBON 1/4W/M(T) 5% 180Kohm
R766	FA040103	CARBON 1/8W(T) 5% 10Kohm
R767	FA040222	CARBON 1/8W(T) 5% 2.2Kohm
R771	FA330332	CARBON 1/2W(T) 5% 3.3Kohm
R800	FA040102	CARBON 1/8W(T) 5% 1Kohm
R801	FA270122	CARBON 1/4W/M(T) 5% 1.2Kohm
R802	FA040102	CARBON 1/8W(T) 5% 1Kohm
R803	FA040331	CARBON 1/8W(T) 5% 330ohm
R804	FB480479	MOF 1W/M(B) 5% 4.7ohm
R830	FA040102	CARBON 1/8W(T) 5% 1Kohm
R831	FA270122	CARBON 1/4W/M(T) 5% 1.2Kohm
R832	FA040331	CARBON 1/8W(T) 5% 330ohm
R833	FA040102	CARBON 1/8W(T) 5% 1Kohm
R834	FB480151	MOF 1W/M(B) 5% 150ohm
R840	FA040102	CARBON 1/8W(T) 5% 1Kohm
R841	FA270122	CARBON 1/4W/M(T) 5% 1.2Kohm
R842	FA040331	CARBON 1/8W(T) 5% 330ohm
R843	FA040102	CARBON 1/8W(T) 5% 1Kohm
R844	FB480151	MOF 1W/M(B) 5% 150ohm
R898	FA040103	CARBON 1/8W(T) 5% 10Kohm
R901	FA360105	CARBON 1/2W/M(T) 5% 1Mohm
R910	FA270474	CARBON 1/4W/M(T) 5% 470Kohm
R911	FA270564	CARBON 1/4W/M(T) 5% 560Kohm

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SYMBOL	Part No. of NPG	DESCRIPTION
R921	FB710104	MOF 3W/M(A) 5% 100Kohm
R922	FB560278	MOF 2W/M(A) 5% 0.27ohm
R923	FA040102	CARBON 1/8W(T) 5% 1Kohm
R924	FA040103	CARBON 1/8W(T) 5% 10Kohm
R925	FA040100	CARBON 1/8W(T) 5% 10ohm
R926	FA040682	CARBON 1/8W(T) 5% 6.8Kohm
R927	FB275101	METAL 1/4W/M(T) 1% 5.1Kohm
R928	FA040334	CARBON 1/8W(T) 5% 330Kohm
R929	FA040682	CARBON 1/8W(T) 5% 6.8Kohm
R930	FA040102	CARBON 1/8W(T) 5% 1Kohm
R933	FA270271	CARBON 1/4W/M(T) 5% 270ohm
R934	FA040390	CARBON 1/8W(T) 5% 39ohm
R935	FA040390	CARBON 1/8W(T) 5% 39ohm
R936	80009811	FUSEBLE Res 1/2W(A)M 1ohm J
R940	FB470103	MOF 1W/M(A) 5% 10Kohm
R941	FB470103	MOF 1W/M(A) 5% 10Kohm
R942	FA040154	CARBON 1/8W(T) 5% 150Kohm
R943	FA040154	CARBON 1/8W(T) 5% 150Kohm
R944	FA040473	CARBON 1/8W(T) 5% 47Kohm
R945	FA040223	CARBON 1/8W(T) 5% 22Kohm
R946	FA040121	CARBON 1/8W(T) 5% 120ohm
R947	FA040562	CARBON 1/8W(T) 5% 5.6Kohm
R948	FA380272	CARBON 1/2W/M(B) 5% 2.7Kohm
R949	FA040103	CARBON 1/8W(T) 5% 10Kohm
R951	FA040471	CARBON 1/8W(T) 5% 470ohm
R952	FB276802	METAL 1/4W/M(T) 1% 68Kohm
R953	FB272203	METAL 1/4W/M(T) 1% 220Kohm
R954	FB272201	METAL 1/4W/M(T) 1% 2.2Kohm
R955	FB276803	METAL 1/4W/M(T) 1% 680Kohm
R957	FB279102	METAL 1/4W/M(T) 1% 91Kohm
R981	FA040153	CARBON 1/8W(T) 5% 15Kohm
R982	FA040101	CARBON 1/8W(T) 5% 100ohm
R983	FA040153	CARBON 1/8W(T) 5% 15Kohm
R9A2	FA040105	CARBON 1/8W(T) 5% 1Mohm
R9B4	FA040103	CARBON 1/8W(T) 5% 10Kohm
R9B5	FB560562	MOF 2W/M(A) 5% 5.6Kohm
R9B6	FA040103	CARBON 1/8W(T) 5% 10Kohm
R9C1	80002031	FUSEBLE Res 1/2W(A)M 0.22ohm J
R9C2	FA040103	CARBON 1/8W(T) 5% 10Kohm
R9C3	FA360102	CARBON 1/2W/M(T) 5% 1Kohm
R9C4	FA040103	CARBON 1/8W(T) 5% 10Kohm
R9C5	FA040472	CARBON 1/8W(T) 5% 4.7Kohm
R9E1	80002031	FUSEBLE Res 1/2W(A)M 0.22ohm J
R9F2	FA040122	CARBON 1/8W(T) 5% 1.2Kohm
R9G1	80009831	FUSEBLE Res 1/2W(A)M 1.5ohm J
R9Y1	FA330184	CARBON 1/2W(T) 5% 180Kohm
R9Y2	FA360224	CARBON 1/2W/M(T) 5% 220Kohm
R9Y3	FA040333	CARBON 1/8W(T) 5% 33Kohm

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SYMBOL	Part No. of NPG	DESCRIPTION
R9Y4	FA040333	CARBON 1/8W(T) 5% 33Kohm
R9Y5	FA360820	CARBON 1/2W/M(T) 5% 82ohm
R9Y6	FA040103	CARBON 1/8W(T) 5% 10Kohm
R9Y7	FA040103	CARBON 1/8W(T) 5% 10Kohm
R9Z1	FA040390	CARBON 1/8W(T) 5% 39ohm
R9Z2	FA040562	CARBON 1/8W(T) 5% 5.6Kohm
R9Z3	FA040223	CARBON 1/8W(T) 5% 22Kohm
*** CAPACITORS ***		
C101	GA347705	ELECT 85oC/T 470u/6.3V M
C102	GM010353	CHIP MONO 10000p/50V K
C104	GM010353	CHIP MONO 10000p/50V K
C105	GM010353	CHIP MONO 10000p/50V K
C106	GM010353	CHIP MONO 10000p/50V K
C107	GM00705C	CHIP MONO 7p/50V C
C108	GM00705C	CHIP MONO 7p/50V C
C109	GM010353	CHIP MONO 10000p/50V K
C111	GM010353	CHIP MONO 10000p/50V K
C112	GA310655	ELECT 85oC/T 10u/50V M
C114	GA310655	ELECT 85oC/T 10u/50V M
C115	GA310655	ELECT 85oC/T 10u/50V M
C123	GA310655	ELECT 85oC/T 10u/50V M
C124	GA310655	ELECT 85oC/T 10u/50V M
C125	GA310655	ELECT 85oC/T 10u/50V M
C126	GA310655	ELECT 85oC/T 10u/50V M
C142	GA310555	ELECT 85oC/T 1u/50V M
C143	GM010353	CHIP MONO 10000p/50V K
C201B	GA247555	ELECT 105oC/T 4.7u/50V M
C201G	GA247555	ELECT 105oC/T 4.7u/50V M
C201R	GA247555	ELECT 105oC/T 4.7u/50V M
C202	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C211B	GA247555	ELECT 105oC/T 4.7u/50V M
C211G	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C211R	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C213	GA233725	ELECT 105oC/T 330u/16V M
C214	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C215	GA210655	ELECT 105oC/T 10u/50V M
C216	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C217	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C218	GA247625	ELECT 105oC/T 47u/16V M
C221	GB7472F3	CERAMIC Y5P(B)/T 4700P/500V K
C222	GA222675	ELECT 105oC/T 22u/100V M
C223	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C224	GA210725	ELECT 105oC/T 100u/16V M
C226	GB7472F3	CERAMIC Y5P(B)/T 4700P/500V K
C241B	80008481	PLASTIC MM/A 0.22u/250V J
C241G	80008481	PLASTIC MM/A 0.22u/250V J
C241R	80008481	PLASTIC MM/A 0.22u/250V J

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SYMBOL	Part No. of NPG	DESCRIPTION
C242	GB7472F3	CERAMIC Y5P(B)/T 4700P/500V K
C243	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C244	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C244B	GA247485	ELECT 105oC/T 0.47u/250V M
C244G	GA247485	ELECT 105oC/T 0.47u/250V M
C244R	GA247485	ELECT 105oC/T 0.47u/250V M
C271	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C272	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C273	GA347625	ELECT 85oC/T 47u/16V M
C291	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C292	GA222725	ELECT 105oC/T 220u/16V M
C293	GF210452	PLASTIC MEF CAP BOX 0.1uF/50V
C294	GB647152	CERAMIC SL/T 470p/50V J
C295	GA210555	ELECT 105oC/T 1u/50V M
C296	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C297	GB722253	CERAMIC Y5P(B)/T 2200P/50V K
C2C1	GB7332H3	CERAMIC Y5P(B)/T 3300p/1KV K
C2C2	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C2C3	GB7331H3	CERAMIC Y5P(B)/T 330p/1KV K LD
C2F1	GB7472F3	CERAMIC Y5P(B)/T 4700P/500V K
C2F2	GB7472F3	CERAMIC Y5P(B)/T 4700P/500V K
C2F6	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C2F7	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C2F8	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C401	GA333625	ELECT 85oC/T 33u/16V M
C402	GF233352	MEF BOX/T 0.033u/50V J
C430	GF268452	PLASTIC MEF BOX/T 0.68u/50V J
C431	GE322352	PLASTIC CAP PEN/T 0.022uF/50V
C451	GA333735	ELECT 85oC/T 330u/25V M
C452	GA310745	ELECT 85oC/T 100u/35V M
C453	GA210745	ELECT 105oC/T 100u/35V M
C454	GF222472	MEF CAP BOX 0.22u/100V J
C461	GF247262	MEF CAP BOX 4700pF/63V J
C462	GB910458	CERAMIC Z5V(F)/T 0.1u/50V Z
C463	GB910458	CERAMIC Z5V(F)/T 0.1u/50V Z
C500	GE210352	PLASTIC PEI/T 0.01u/50V J
C501	GM010252	CHIP MONO 1000p/50V J
C502	GA310555	ELECT 85oC/T 1u/50V M
C503	GM039152	CHIP MONO 390p/50V J
C504	GA310555	ELECT 85oC/T 1u/50V M
C505	GA310725	ELECT 85oC/T 100u/16V M
C506	GM010433	CHIP MONO 0.1u/25V K
C507	GA347725	ELECT 85oC/T 470u/16V M
C508	GM010152	CHIP MONO 100p/50V J
C509	GE310252	PLASTIC CAP PEN/T 1000P/50V
C510	GF233352	MEF BOX/T 0.033u/50V J
C511	GA310655	ELECT 85oC/T 10u/50V M
C512	GA310655	ELECT 85oC/T 10u/50V M

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SYMBOL	Part No. of NPG	DESCRIPTION
C515	GE415272	PLASTIC PPN/T 1500p/100V J
C516	GM047152	CHIP MONO 470p/50V J
C551	GF247452	PLASTIC MEF BOX/T 0.47u/50V J
C552	GB722253	CERAMIC Y5P(B)/T 2200P/50V K
C553	GF247452	PLASTIC MEF BOX/T 0.47u/50V J
C554	GA247735	ELECT 105oC/T 470u/25V M
C555	GB7332F3	CERAMIC Y5P(B)/T 3300p/500V K
C561	80010121	DKRG (390) 1.5KHP 402H-FC
C562	GBD221J3	CERAMIC Y5P(B)/A 220p/2KV K P=
C563	GF282262	MEF CAP BOX 8200pF/63V J
C564	GB610152	CERAMIC SL/T 100p/50V J
C571	GA210745	ELECT 105oC/T 100u/35V M
C572	GB7182F3	CERAMIC Y5P(B)/T 1800P/500V K
C573	80010141	DHSM (204) 250V 913J-FC 7.5mm
C574	80010151	DHSM (204) 250V 104J-FC 7.5mm
C575	80010161	DHSM (204) 250V 824J-FC 7.5mm
C577	80010171	DHSM (204) 250V 304J-FC 7.5mm
C578	80010181	DHSM (204) 250V 753J-FC 7.5mm
C579	80010191	DHSM (204) 250V 124J-FC 7.5mm
C57A	80010201	DHSM (204) 250V 564J-FC 7.5mm
C57E	GB910458	CERAMIC Z5V(F)/T 0.1u/50V Z
C57F	GB910458	CERAMIC Z5V(F)/T 0.1u/50V Z
C57G	GB910458	CERAMIC Z5V(F)/T 0.1u/50V Z
C57H	GB910458	CERAMIC Z5V(F)/T 0.1u/50V Z
C57J	GB910458	CERAMIC Z5V(F)/T 0.1u/50V Z
C581	GA233715	ELECT 105oC/T 330u/10V M
C582	GA233715	ELECT 105oC/T 330u/10V M
C583	GF210452	PLASTIC MEF CAP BOX 0.1uF/50V
C584	GF247452	PLASTIC MEF BOX/T 0.47u/50V J
C5A2	GA222585	ELECT 105oC/T 2.2u/250V M
C5A3	GA222585	ELECT 105oC/T 2.2u/250V M
C5G1	GAB10785	ELECT 105oC/A 100u/250V M
C5G2	80009111	PLASTIC MPE/A 0.1u/250V K P=10
C701	GA233625	ELECT 105oC/T 33u/16V M
C702	GF210452	PLASTIC MEF CAP BOX 0.1uF/50V
C703	GB639052	CERAMIC SL/T 39p/50V J
C704	GA310655	ELECT 85oC/T 10u/50V M
C705	GF247452	PLASTIC MEF BOX/T 0.47u/50V J
C706	GB647052	CERAMIC SL/T 47p/50V J
C707	GF210452	PLASTIC MEF CAP BOX 0.1uF/50V
C708	GF215452	PLASTIC MEF BOX/T 0.15u/50V J
C709	GA310725	ELECT 85oC/T 100u/16V M
C70A	GA233625	ELECT 105oC/T 33u/16V M
C70E	GF247452	PLASTIC MEF BOX/T 0.47u/50V J
C70F	GA322625	ELECT 85oC/T 22u/16V M
C711	80010131	DKRG (390) 800HP 222J-FC
C712	GED822E2	PLASTIC PPN/A 8200p/400V J p=10
C713	GAB22775	ELECT 105oC/A 220u/100V M

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SYMBOL	Part No. of NPG	DESCRIPTION
C721	GF247452	PLASTIC MEF BOX/T 0.47u/50V J
C731	GA422555	ELECT NP/T 2.2u/50V M
C741	GA322555	ELECT 85oC/T 2.2u/50V M
C742	GA210555	ELECT 105oC/T 1u/50V M
C752	GFB47482	PLASTIC MPP/A 0.47u/250V J
C753	GF215472	PLASTIC MEF BOX/T 0.15u/100V J
C761	GB7102F3	CERAMIC Y5P(B)/T 1000p/500V K
C762	80009421	ELECT 105oC/T 1u/450V M
C763	GA447625	ELECT NP/T 47u/16V M
C764	GF215452	PLASTIC MEF BOX/T 0.15u/50V J
C800	GB910458	CERAMIC Z5V(F)/T 0.1u/50V Z
C801	GA310655	ELECT 85oC/T 10u/50V M
C802	GA310555	ELECT 85oC/T 1u/50V M
C830	GB910458	CERAMIC Z5V(F)/T 0.1u/50V Z
C831	GA310655	ELECT 85oC/T 10u/50V M
C832	GA310555	ELECT 85oC/T 1u/50V M
C840	GB910458	CERAMIC Z5V(F)/T 0.1u/50V Z
C841	GA310655	ELECT 85oC/T 10u/50V M
C842	GA310555	ELECT 85oC/T 1u/50V M
C901	GJ047405	SAFETY X-CAP 0.47u/275V M(PHIL
C902	GJD222E5	SAFETY Y-CAP/S 2200P/400V M
C903	GJD222E5	SAFETY Y-CAP/S 2200P/400V M
C906	GJC222E5	SAFETY Y-CAP/D 2200P/400V M
C911	GKA337E5	POWER ELECT 85oC 330u/400V M
C921	GFA333E3	PLASTIC MPE/A 0.033u/400V K
C922	80005551	CERAMIC Y5P(B)/T 220p/1KV K LD
C923	GF233262	PLASTIC MEF CAP BOX 0.0033u/63V
C924	GE268252	PLASTIC PEI/T 0.0068u/50V J
C925	GA333625	ELECT 85oC/T 33u/16V M
C926	GF222462	PLASTIC MEF BOX 0.22u/63V J
C927	GE215352	PLASTIC PEI/T 0.015u/50V J
C928	GF233262	PLASTIC MEF CAP BOX 0.0033u/63V
C931	GA310735	ELECT 85oC/T 100u/25V M
C932	GA347635	ELECT 85oC/T 47u/25V M
C933	GB682052	CERAMIC SL/T 82p/50V K
C940	GA310555	ELECT 85oC/T 1u/50V M
C951	GM068253	CHIP MONO 6800p/50V K
C952	GB7680F3	CERAMIC Y5P(B)/T 68P/500V K
C981	GE210352	PLASTIC PEI/T 0.01u/50V J
C982	GA333735	ELECT 85oC/T 330u/25V M
C9A1	GAB10785	ELECT 105oC/A 100u/250V M
C9A2	GAB22685	ELECT 105oC/A 22u/250V M
C9B1	GAB107B5	ELECT 105oC/A 100u/160V M
C9C1	GAB33835	ELECT 105oC/A 3300u/25V M
C9C2	GA347625	ELECT 85oC/T 47u/16V M
C9D1	GAB22825	ELECT 105oC/A 2200u/16V M
C9E1	GAB22835	ELECT 105oC/A 2200u/25V M
C9F1	GA347625	ELECT 85oC/T 47u/16V M

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SYMBOL	Part No. of NPG	DESCRIPTION
C9F2	GB910358	CERAMIC Z5V(F)/T 0.01u/50V Z
C9G1	GA210735	ELECT 105oC/T 100u/25V M
C9G2	GAB10825	ELECT 105oC/A 1000u/16V M
C9Y2	GA347635	ELECT 85oC/T 47u/25V M
C9Y3	GA347635	ELECT 85oC/T 47u/25V M

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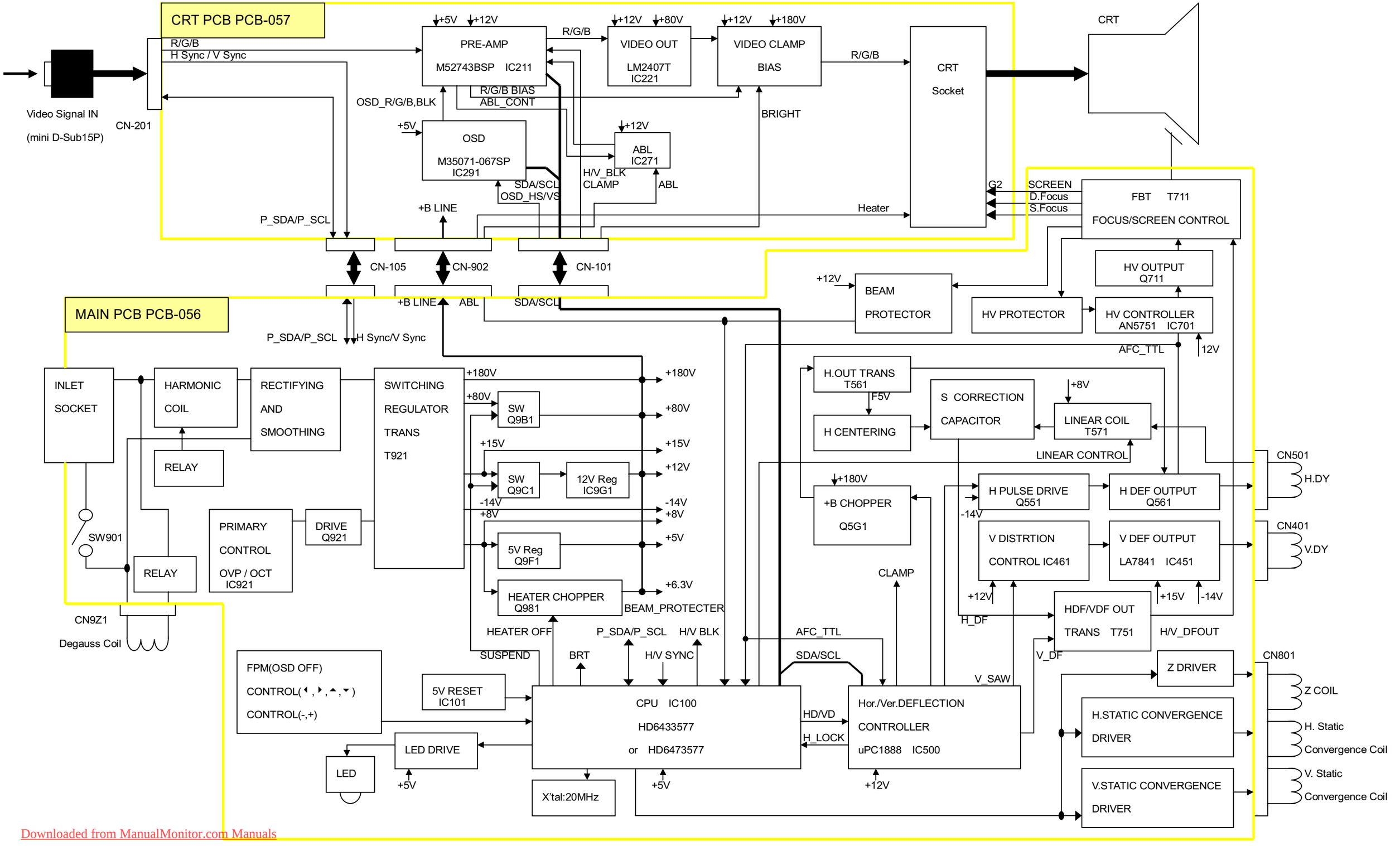
BLOCK DIAGRAM MODEL Diamond Pro 730



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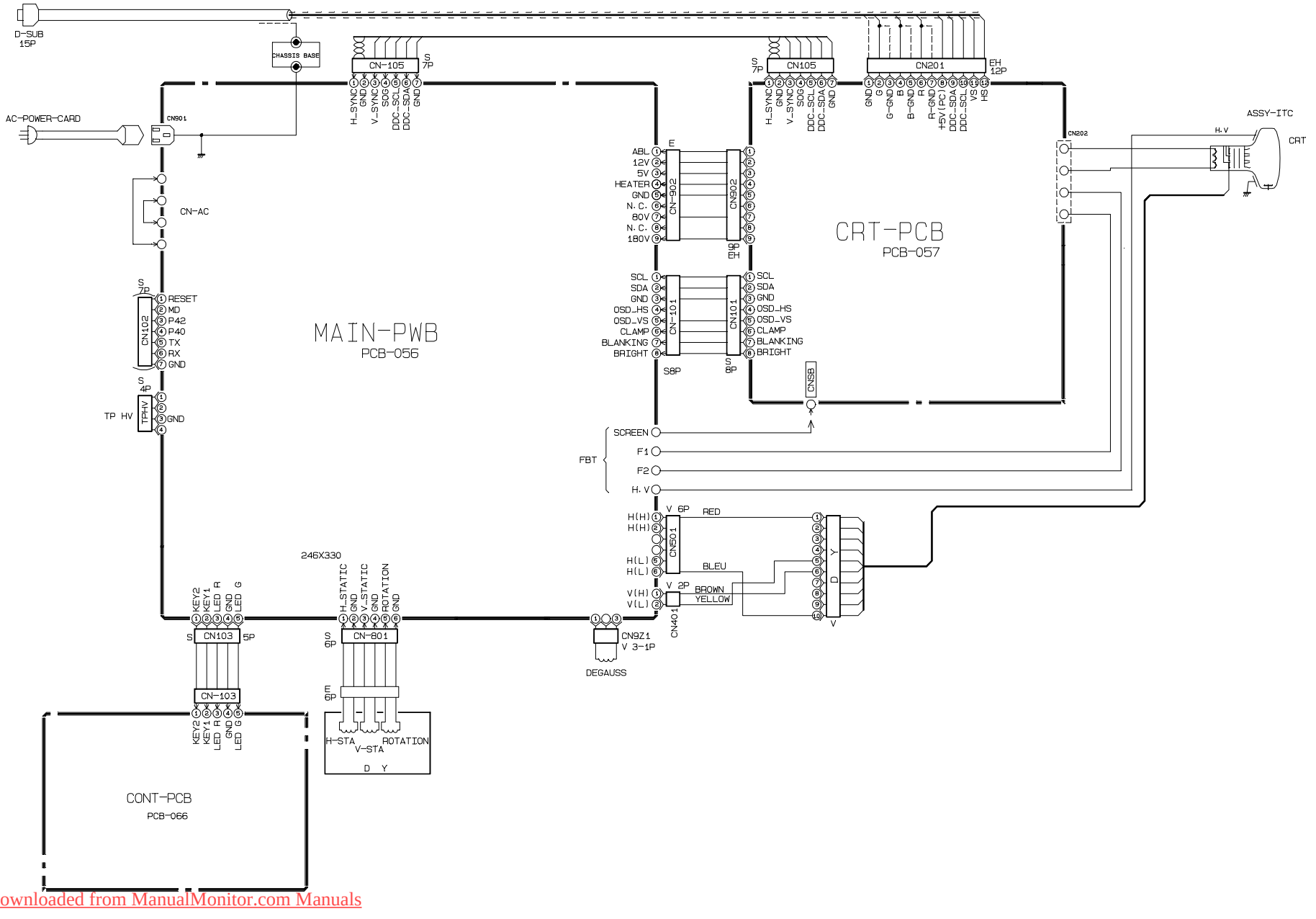

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MODEL JC-17W41 MAIN PWB SCHEMATIC DIAGRAM (1/5)

MAIN PCB PCB-056

CONTROL

HV

ABL

DEGAUSS 35

CN-902 9P

+180V

+80V

GND

HEATER

+5V

+12V

ABL

+180V

+80V

-15V

+15V

+12V

A15V

+5V

+8V

HEATER

HEATEROFF 42

SUSPEND 5

CONTROL

AC-IN

CN901 AC SOCKET 3P

CN-AC

SW901 SDKLA10200

F901 3.15A 250V

C901 0.47u 275V

R901 1M 1/2W

L901 ET24 11mH

C902 2200p 400V

C903 2200p 400V

L902 UU10.5 1mH

RP9Z1 PTC4.5ohm

CN9Z1 DG 3-1

JP19Y1 OPEN

JP19Y2 OPEN

RY9Y1

100-120V	②-③ SHORT ⑥-⑦ SHORT
220-240V	④-③ SHORT ⑤-⑥ SHORT

L9Y1 HARMONIC COIL EE35 88mH

RY9Y1 MI-SS-212D G2R-2

D9Y3 1SS83 1SS244

C9Y3 47u 25V

R9Y1 180K 1/8W

R9Y2 220K 1/8W

Q9Y1 2SC1740S

D9Y4 HZ6C2

Q9Y2 2SA733P

R9Y3 33K 1/8W

R9Y4 33K 1/8W

Q9Y3 2SC945

R9Y5 82 1/2W

D9Y5 HER103

C9Y2 25V 47u

RY9Z1 SDT-S-112LMR G5PA-1

D9Z1 1N4148

R9Z1 39 1/8W

R9Z2 5.6K 1/8W

R9Z3 22K 1/8W

Q9Z1 KTC945-P 2SC1740S DEGAUSS ON/OFF

D9A2 1N4005

R9A2 1M 1/8W

L9A2 WBRGH-3T-R7K-B5

JP19A2

D911 1N5406

D912 1N5406

D913 1N5406

D914 1N5406

C906 2200p 400V

TH901 SCK064 NTCR5ohm4A

C911 330u 400V

R910 470K 1/4W

R911 560K 1/4W

R921 100K 3W

D921 BA159

C921 0.033u 400V

C922 220p 1KV

R941 JP19A1

L9A1 BEAD 3.5*4.7/T

D9A1 RG2A UF2005

C9A1 100u 250V HT

L9B3 BEAD 3.5*4.7/T

L9B2 BEAD 3.5*4.7/T

L9B1 WBRGH-3T-R7K-B5

D9B1 RL4A

C9B1 100u 160V HT

JP19E1

L9E1 BEAD 3.5*4.7/T

R9E1 0.22 1/2W F.S

D9E1 RG4Z UF5402

C9E1 2200u 25V HT

R9B7 OPEN 1/2W

JP19B2

Q9B1 2SB861C

R9B4 10K 1/8W

R9B5 5.6K 2W

Q9B2 KTC3200

R9B6 10K 1/8W

R942 150K 1/8W

R943 150K 1/8W

R940 10K 1W

R941 10K 1W

Q941 2SC945

Q940 KSP44 MPSA44

R945 22K 1/8W

R944 47K 1/8W

D941 HZ20-2

D940 1N4148

R948 2.7K 1/2W

D948 HZ27-1

R949 10K 1/8W

Q942 2SA733P

R946 120 1/8W

R947 5.6K 1/8W

D943 1SS244

Q943 2SC945

C940 1u

C932 47u 25V

C931 100u 25V

D926 1N4936

D927 1N4936

R936 1.2 1/2W F.S

T921 ERL39

JP19D1

L9D1 BEAD 3.5*4.7/T

D9D1 RG4Z UF5402

C9D1 2200u 16V HT

JP19C1

L9C1 BEAD 3.5*4.7/T

R9C1 0.22 1/2W F.S

D9C1 RG4Z UF5402

C9C1 3300u 25V HT

L921 BEAD 2.3*7.5*7.3/T

R951 470 1/8W

C951 6800p CHIP

R955 680K 1/4W 1%

R957 91K 1/4W 1%

R952 68K 1/4W 1%

C952 68p 500V

R954 2.2K 1/4W 1%

R953 220K 1/4W 1%

R9C3 1K 1/2W

R9C2 10K 1/8W

C9C2 47u 16V

R9C4 10K 1/8W

R9C5 4.7K 1/8W

Q9C1 KSB772

Q9C2 2SC945

IC922 TLP721F GR PS2561-1D-W TLP421F GR

IC951 uPC1093J KA431

Q921 2SK2645

HOT 1次側

COLD 2次側

R9F2 1.2K 1/8W

IC9G1 KIA7812API KA7812

C9G1 100u 25V

C9G2 1000u 16V HT

C9G3 OPEN

D9F1 1N4148

Q9F1 2SC1213AC 2SC2120 KSC2001Y

D9F2 HZ6C1

D9F3 1N4148

C9F1 47u 16V

C9F2 0.01u

Q981 KTB1151 HEATER ON/OFF 1

L981 33u

C981 0.01u

D981 MER103

C982 330u 25V

R981 15K 1/8W

R982 10K 1/8W

R983 15K 1/8W

Q982 2SA733P HEATER ON/OFF 2

JP1981

R984 SHORT

Q983 DTC114WSA HEATER ON/OFF 3

R926 6.8K 1/8W

C928 3300p 63V

INTERNAL BIAS

5V REF

S/R

UVLO 16V 34V 6V

17.6V

VCC

VREF GOOD LOGIC

OSC

2.5V

RT/CT

ERROR AMP

2R

R 1V

S R PWM LATCH

CURRENT SENSE COMPARATOR

OUTPUT

GROUND

0.3V

ISENSE

VREF

VFB

COMP

IC921 UC3842AM

R927 5.1K 1/4W 1%

R928 330K 1/8W

C924 6800p

R929 6.8K 1/8W

R930 1K 1/8W

C925 33u 16V

C926 0.22u 63V

D924 1N4148

R934 39 1/8W

C927 0.015u

R933 270 1/4W

R935 39 1/8W

D925 OPEN

D923 1N4148

R925 10 1/8W

D922 HZ24-3

R924 10K 1/8W

L922 BEAD WBRGH-3T-R7K-B5

R923 1K 1/8W

C923 3300p 63V

R922 0.27 2W

C933 82p

CN904 from FBT TRIGGER PULSE

NO DESCRIPTION CAPACITOR 50V

CRITICAL COMPONENT

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MODEL JC-17W41 MAIN PWB SCHEMATIC DIAGRAM (2/5)

	FE750+	others
R1C1	NL	180 1/4W
R1C2	NL	220 1/4W
R1Y7	180 1/4W	OPEN
R1Y8	680 1/4W	OPEN
R1Y9	180 1/4W	OPEN
R1YA	680 1/4W	OPEN
R1X1	OPEN	330 1/4W
R1X2	OPEN	680 1/4W
R1X3	OPEN	2K 1/4W
R1X4	OPEN	330 1/4W
R1X5	OPEN	680 1/4W
R1X6	OPEN	2K 1/4W
R1Y1	330 1/4W	OPEN
R1Y2	680 1/4W	OPEN
R1Y3	2K 1/4W	OPEN
R1Y4	330 1/4W	OPEN
R1Y5	680 1/4W	OPEN
R1Y6	2K 1/4W	OPEN

	FE750+	others
SW1X1	OPEN	TACT SW 1P
SW1X3	OPEN	TACT SW 1P
SW1X4	OPEN	TACT SW 1P
SW1X5	OPEN	TACT SW 1P
SW1X6	OPEN	TACT SW 1P
SW1X7	OPEN	TACT SW 1P
SW1X8	OPEN	TACT SW 1P
SW1Y2	TACT SW 1P	OPEN
SW1YA	TACT SW 1P	OPEN
SW1YC	TACT SW 1P	OPEN
SW1Y5	TACT SW 1P	OPEN
SW1Y6	TACT SW 1P	OPEN
SW1Y7	TACT SW 1P	OPEN
SW1Y8	TACT SW 1P	OPEN
D1C1	OPEN	L-59GH/1GYC
D1Y1	SMLS79723C	OPEN
D1Y2	SMLS79723C	OPEN

NO DESCRIPTION RESISTOR 1/10W R-CARBON-CHIP
NO DESCRIPTION CAPACITOR 50V

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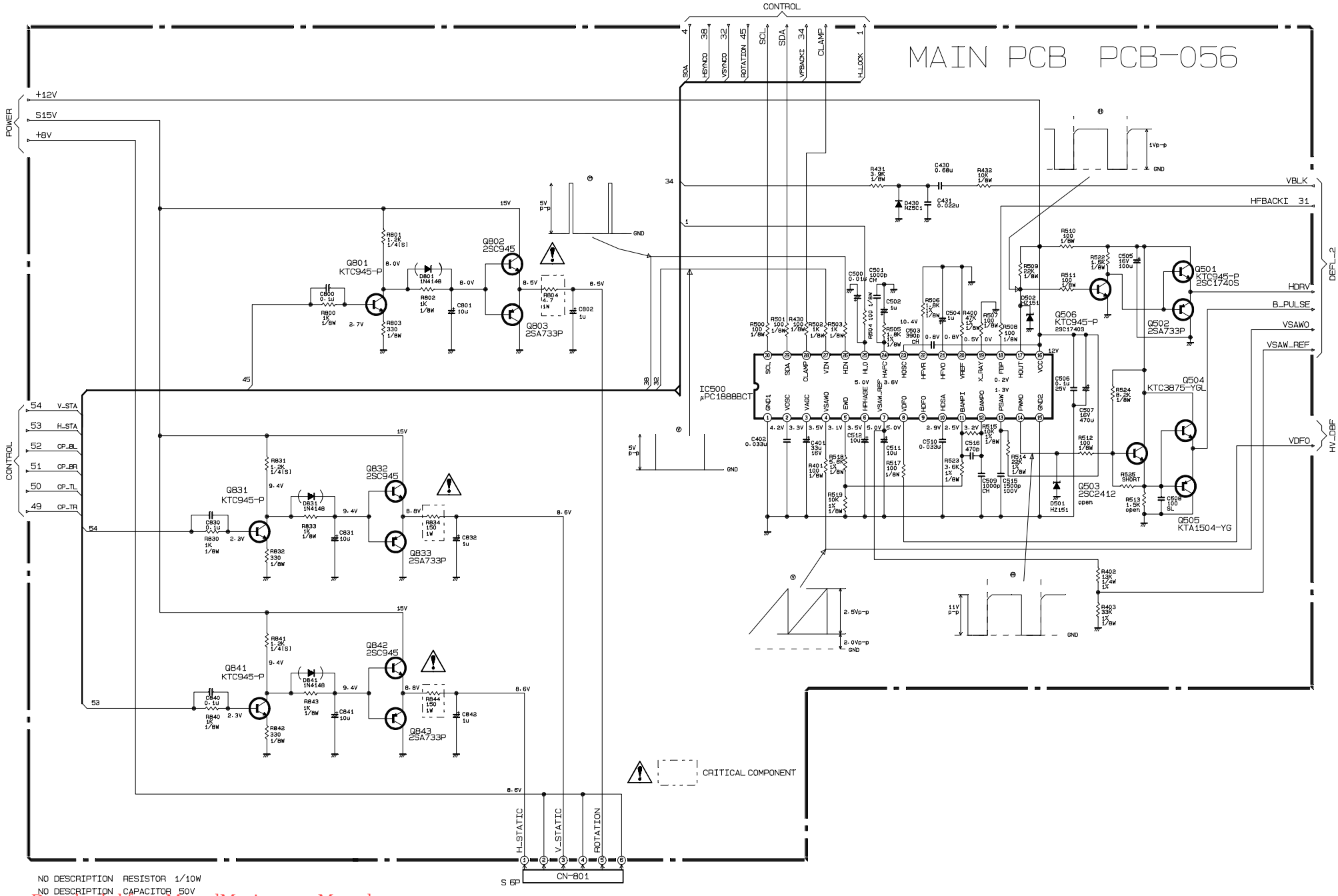

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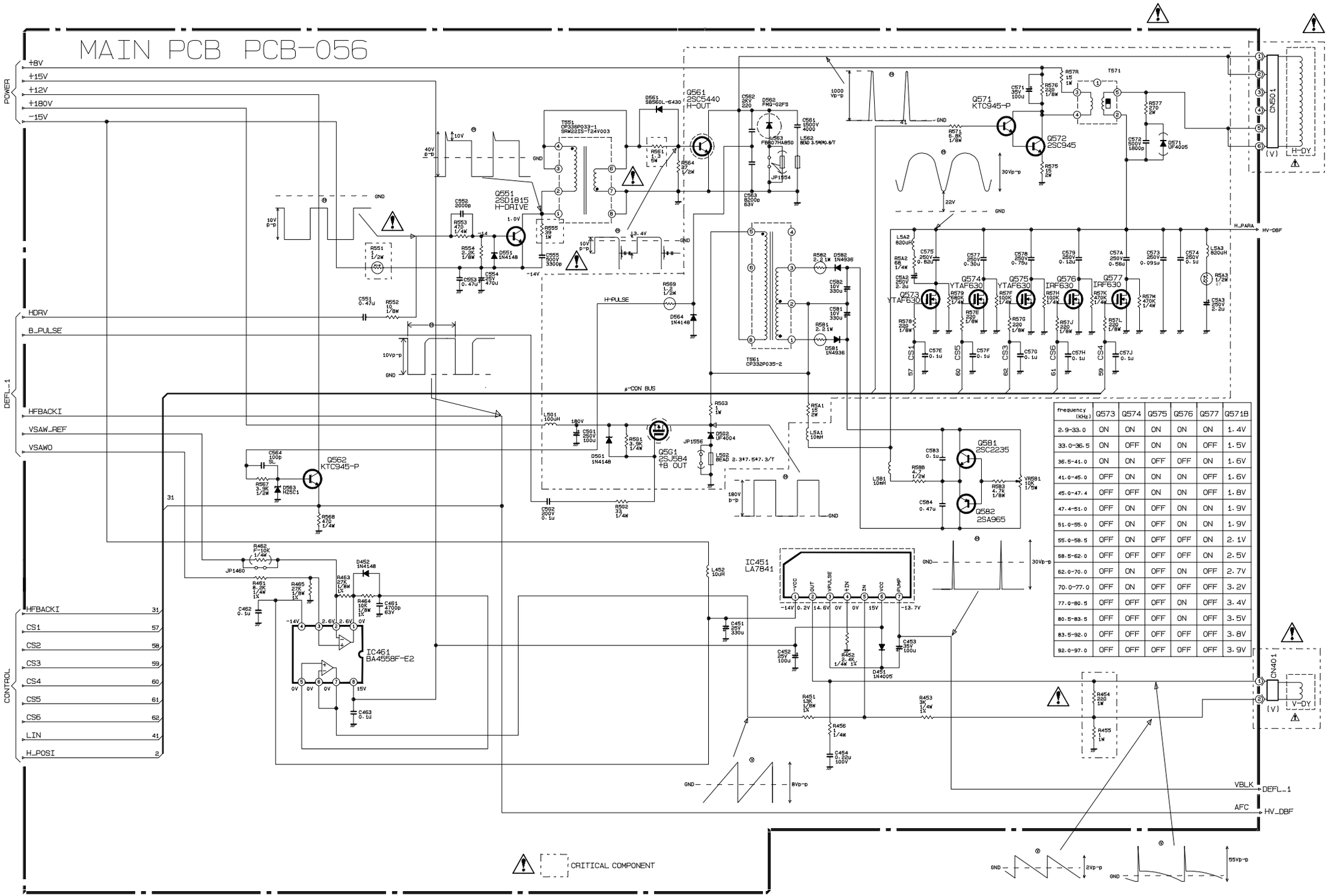

frequency (KHz)	Q573	Q574	Q575	Q576	Q577	Q571B
2.9-33.0	ON	ON	ON	ON	ON	1.4V
33.0-36.5	ON	OFF	ON	ON	OFF	1.5V
36.5-41.0	ON	ON	OFF	OFF	ON	1.6V
41.0-45.0	OFF	ON	ON	ON	OFF	1.6V
45.0-47.4	OFF	OFF	ON	ON	OFF	1.8V
47.4-51.0	OFF	ON	OFF	ON	ON	1.9V
51.0-55.0	OFF	ON	OFF	ON	ON	1.9V
55.0-58.5	OFF	ON	OFF	OFF	ON	2.1V
58.5-62.0	OFF	OFF	OFF	OFF	ON	2.5V
62.0-70.0	OFF	ON	OFF	ON	OFF	2.7V
70.0-77.0	OFF	ON	OFF	OFF	OFF	3.2V
77.0-80.5	OFF	OFF	OFF	ON	OFF	3.4V
80.5-83.5	OFF	OFF	OFF	ON	OFF	3.5V
83.5-92.0	OFF	OFF	OFF	OFF	OFF	3.8V
92.0-97.0	OFF	OFF	OFF	OFF	OFF	3.9V

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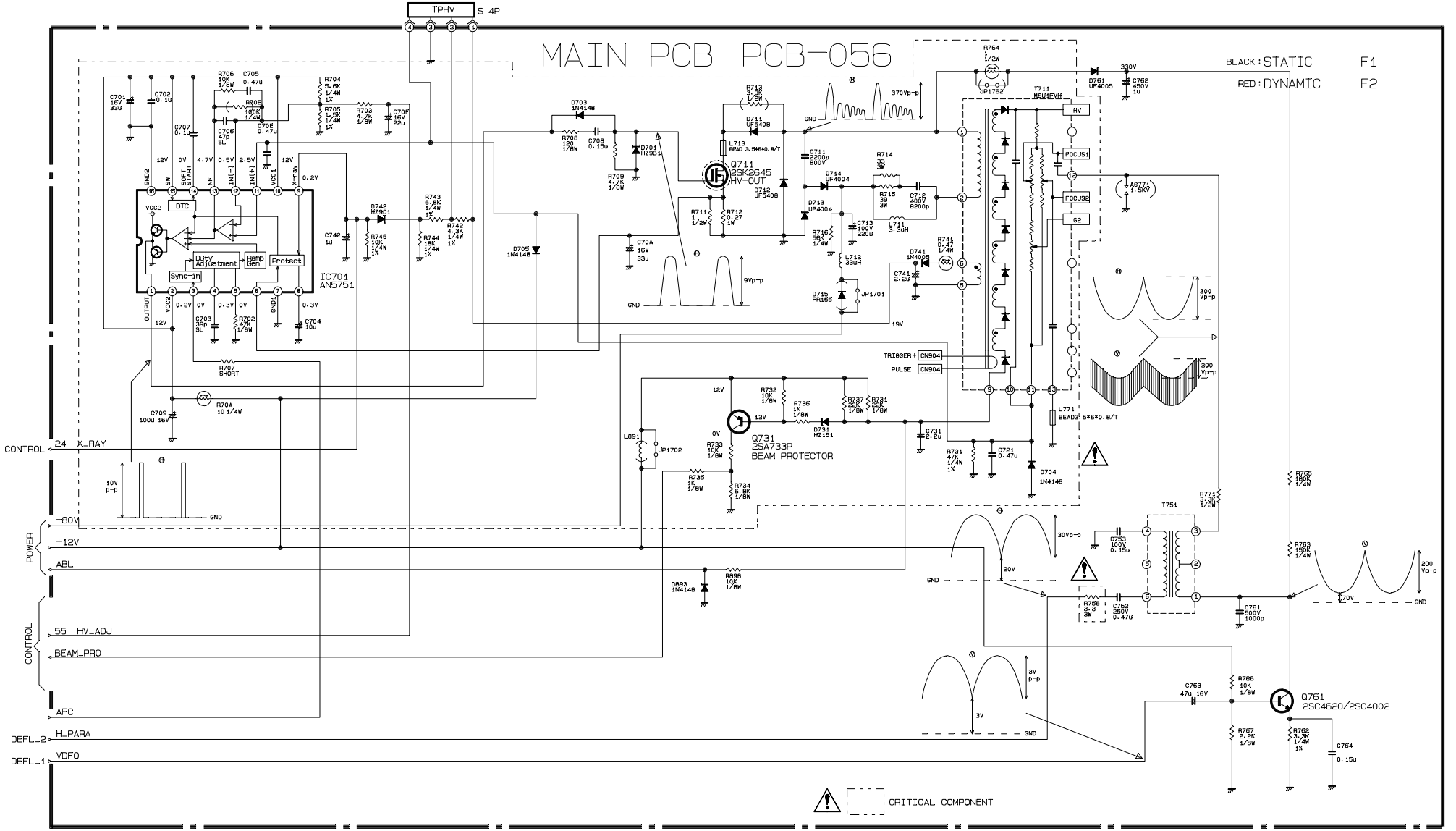
NO DESCRIPTION CAPACITOR 50V



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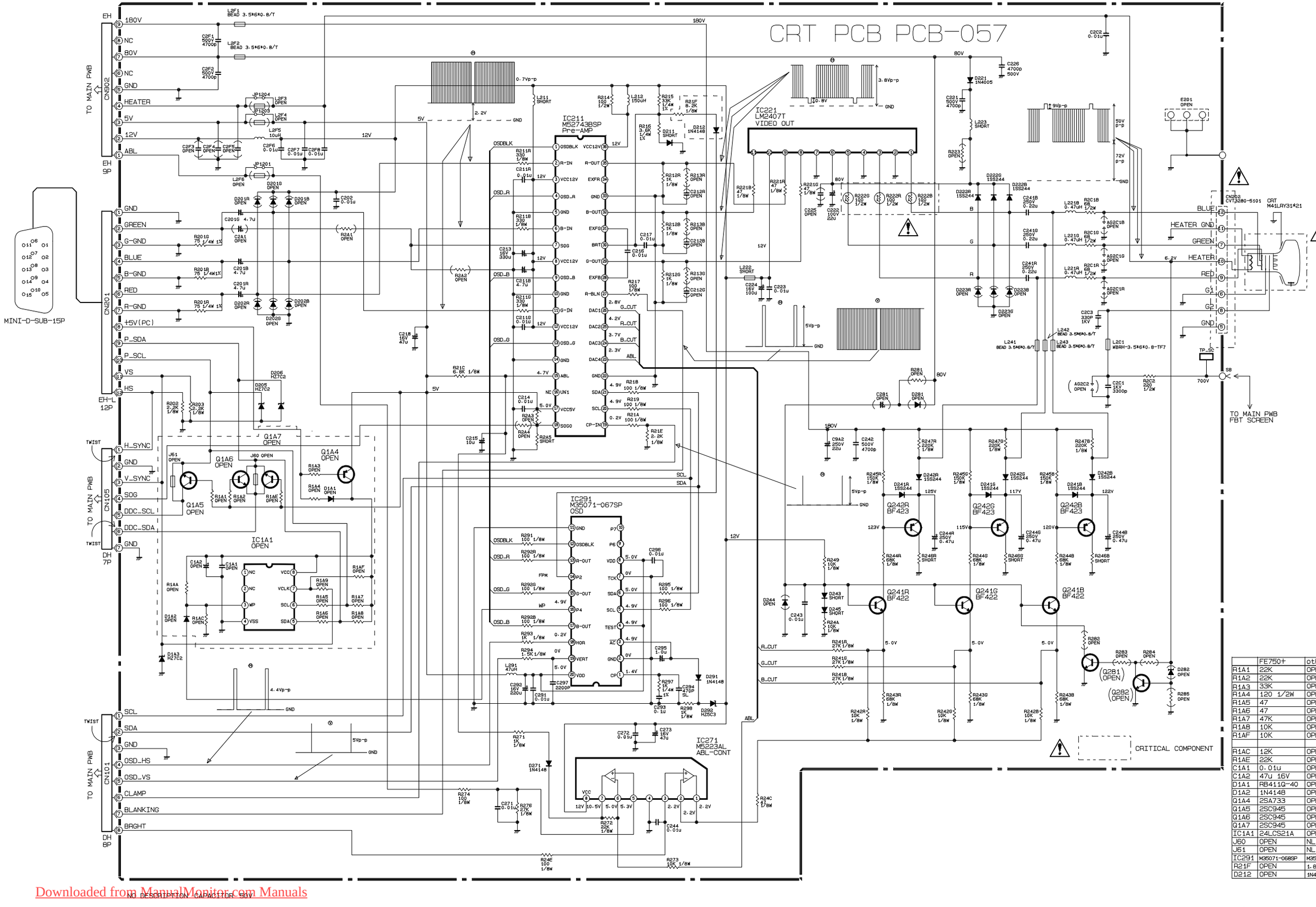
CRT PCB PCB-057



	FE750+	other
R1A1	22K	OPEN
R1A2	22K	OPEN
R1A3	33K	OPEN
R1A4	120 1/2W	OPEN
R1A5	47	OPEN
R1A6	47	OPEN
R1A7	47K	OPEN
R1A8	10K	OPEN
R1AF	10K	OPEN
R1AC	12K	OPEN
R1AE	22K	OPEN
C1A1	0.01u	OPEN
C1A2	47u 16V	OPEN
D1A1	RB411Q-40	OPEN
D1A2	1N4148	OPEN
Q1A4	2SA733	OPEN
Q1A5	2SC945	OPEN
Q1A6	2SC945	OPEN
Q1A7	2SC945	OPEN
IC1A1	24LCS21A	OPEN
J60	OPEN	NL
J61	OPEN	NL
IC291	M35071-068SP	M35071-067SP
R21F	OPEN	1.8K 1/8W
D212	OPEN	1N4148

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NO DESCRIPTION CAPACITOR 50V